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ICONOGRAPHIC
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OF

SCIENCE, LITERATURE, AND ART.

SYSTEMATICALLY ARRANGED

BY

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GEOGRAPHY AND PLANOGRAPHY.

[Including a complete glossary of all those German geographical names and terms on the plates, which vary from the English, comprising also the *modern* names of *ancient* places, rivers, &c. The Longitude in the Maps is reckoned from the meridian of Ferro. To reduce it to the meridian of Greenwich (which is that used throughout the text) add 18° 10' for W. long., and subtract the same for E. long.]

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GLOSSARY TO THE GEOGRAPHICAL MAPS.

Abasgia, Abkhas.
Abassien, Abassi (tribe in North Africa).
Abbitibes, Abbitibbe River.
Abdera, Adra.
Abrincate, Abrincafui.
Abyssinien, Abyssinia.
Acci, Guadix.
Achalziche, Akalzike.
Achen, Aix la Chapelle.
Acincum, Buda Pest.
Adagk, Island Adack.
Admiralitäts Is., Admiralty Islands.
Adrianopol, Adrianople.
Adriatisches Meer, Adriatic Sea.
Adulis, St. Gothard.
Ægadishe In., the islands of Levanzo, Favignana, and Maritimo (the ancient Ægades).
Ægäisches Meer, Archipelago.
Ægypten, Egypt.
Ægyptische Schöne wovon 18 $\frac{1}{2}$ a. d. Gr., Egyptian miles 18 $\frac{1}{2}$ to a degree.
Elana, Akaba.
Emona, Laybach.
Æquat. d. ewigen Schnees, Equator of perpetual snow.
Æquatorgrenze d. Schneefalles, Equatorial boundary of snow.
Æquatorialgrenze d. europ. tropn. Getreides, Equatorial boundary of European tropical grain.
Æquatorialgr. des ewigen Schnees, Equatorial boundary of perpetual snow.
Æthiopien, Ethiopia.

GLOSSARY—(Continued.)

Äthiopisches Meer, Ethiopian Sea.
Agrigentum, Girgenti.
Aguja Sp., Cape Aguya.
Akjermand, Akerman.
Alands In., Aland Islands.
Alanen, Alani.
Albanien, Albany.
Albaracin, Albarracin.
Albersche, Alberche River.
Albis, Elbe River.
Albufeira, Albufera.
Albufera See, Lake Albufera.
Alemannen, Alemanni.
Aleschki, Aleshki.
Aleuten Inseln, Aleutian Islands.
Alexandrien, Alexandria.
Algesiras, Al Gezira.
Algier, Algiers.
Alpen 1200 t. mittlere Höhe, Alps 1200 toises mean height.
Alpen Gebirge, the Alps.
Alpes Bastarnicæ, Lower Alps.
Alpes Rhætia, Rhetian Alps.
Alsen, Isle of Als.
Alt Californien, Upper California.
Alter Molo, Old pier.
Amassera, Amasserah.
Ambozer Hochland, Ambose Highlands.
Amenis, Ameni Island.
Amiranten I., Amirante Islands.
Amisia, Ems River.
Ammonia, Hargiah.
Ancyra, Angora.
Andalusien, Andalusia.
Andamanen, Andaman Islands.
Andes von Peru, the Andes of Peru.
Andes von Quito, the Andes of Quito.
Andöe, Island of Andoen.
Andros mit Hafen, Andros with port.
Anemurium, Cape Anamour.
Angeln, Angli.
Anten, Antæ (Sarmatian tribe).
Antinoe, Enseneh.
Antwerpen, Antwerp.
Anurigrammum, Anurajapoera.
Aornus, Ohund.
Aosta Thal, Aosta Valley.
Apeliotes (Ost), Southeast trade-wind.
Apenninen Geb., the Apennines.
Apulien, Apulia.
Aquæ Sextiæ, Aix.
Aquitaniën, Aquitania.
Arabien, Arabia.
Arabische Wüste, Arabian Desert.
Arab. Mb., Arabian Gulf.
Arabisches od. Persisches Meer, Arabian or Persian Sea.
Arachosia, S. E. Cabul.
Arachotus, Lora River.
Aral See, Aral Sea.
Aran, Karabagh.
Araxes, Aras River.
Arbela, Arbay.
Archangelsk, Archangel.
Archipel von Neu Britannia, Archipelago of New Britain.
Archipel der Niedrigen Inseln, Low Islands.
Archipelagus, Archipelago.
Ardennen, Ardennes.
Arélate, Arles.

GLOSSARY—(Continued.)

Argolische In., Archipelago of Nauplia.
Argelis, Argellez.
Argentoratun, Strasbourg.
Argonnen Wald, the Argonne Forest.
Aria, Khorasan.
Aria See, Lake of Zarrah.
Ariaspa, Ariaspes (inhabitants of Aria, in ancient Drangiana, in Persia).
Ariminum, Rimini.
Armenier, Armenians.
Armoricum, ancient Aquitania (S. W. France).
Arnheim, Arnhem.
Aroe, Patras.
Arsanus, Murad River.
Arsinoe, Suez.
Art. Magazin, Artillery Arsenal.
Aru In, Aroo Islands.
Arvernum, Auvergne.
Asiatisches Russland, Asiatic Russia.
Asiatisches Sarmatn., Asiatic Sarmatia.
Asow, Azov.
Asowsches Meer, Sea of Azov.
Assomtion, Asuncion.
Assyrn., Assyria.
Asta, Asti.
Asturica, Astorga.
Asturien, Asturias.
Athabasca S., Lake Athapescow.
Athen, Athens.
Athenæ, Athens.
Athribis, Tel Atrib.
Atlantischer Ocean, Atlantic Ocean.
Atschin, Acheen.
Attalia, Adalia.
Attici, Inhab. of Attica.
Augila, Angela.
Aug. Turinorum, Turin.
Aug. Vindelicorum, Augsburg.
Augustodunum, Autun.
Aulona, Valona.
Auster (Süd), South Wind.
Australien, Australia.
Austral. Busen, Gulf of Anstralia.
Austrasien, Empire of Chlodwig.
Avalites, Zeyla.
Avalitischer G., Bay of Zeyla.
Aventicum, Avenche.
Avernum, Lake Averno.
Azania, Ajan.
Azorische Inseln, Portugiesisch, the Azores, Portuguese.
Azowsches Meer, Sea of Azov.

B. von Athen od. v. Ægina, Bay of Athens or of Ægina.
B. von Nauplia od. v. Argos, Bay of Nauplia or of Argos.
Babadagh, Baba Dag.
Bagistanus, Beesitoun.
Bagous Geb., Bagous Mountains.
Bahama Inseln, Bahama Islands.
Bai u. Dorf Catalan, Bay and village of Catalan.
Baiern, Bavaria.
Baikal S. u. Geb., Baikal Lake and Mountains.
Baireuth, Bayreuth.
Bairischer Wd., Bavarian Forest.
Baktrien, Bactriana.
Balearen, Balearic Islands.
Baleares, Balearic Islands.
Balearischer Canal, Balearic Channel

GLOSSARY—(Continued.)

Balkan Geb., Balkan Mountains.
Balkasch S., Lake Balkash.
Baltica, Sweden.
Banasa, Meheduma.
Banater Geb., Banat Mountains.
Banater Milit. Grenze, Military frontier of the Banat.
Banks Land, Banks' Island.
Barcelonnetti, Barceloneta.
Barcino, Barcelona.
Baschkiren, Bashkirs.
Bass Strasse, Bass's Strait.
Bassistis, Bashnia.
Baumwolle, Cotton.
Baumwolle u. Reis, Cotton and Rice.
Bayrische Alpen, Bavarian Alps.
Bayrisches Hochland, Bavarian Highlands.
Behrings Meer, Behring's Strait.
Behrings Meer od. Meer von Kamtschatka, Behring's Strait or Kamtschatkian Sea.
Belgien, Belgium.
Belice, Belici River.
Belochroboten, Belochrobati (Slavonian tribe).
Belzoi See, Lake Belzoi.
Berenike, Bengazi.
Berg Andros, Mount Andros.
Berkley Sund, Berkeley Sound.
Bermudas od. Sommer I., Bermudas or Somers Islands.
Berner Alpen, Bernese Alps.
Bernstein Küste, Amber Coast.
Bessarabien, Bessarabia.
Bieler S., Lake of Biel.
Bjelos See, Lake Biellos.
Biled-ul-gerid, od. Dattelland, Biled-ul-gerid, or Land of Dates.
Biscayscher Meerbusen, Bay of Biscay.
Bithynien, Bithynium.
Blaue Bge., Blue Mountains.
Bodensee, Lake of Constance.
Böhmische Höhe, Bohemian Highlands.
Böhmischer Kessel, Bohemian Basin.
Bogen Indianer, Strongbow Indians (tribe of the Chippeways).
Bolzoi, oder Grosser See, Bolzoi or Large Lake.
Boreas (Nord), North Wind.
Borysthenes, Pripet River.
Borysthenes (Danapris), Dniepr River.
Bosnien, Bosna.
Bostra, Boszra.
Bothnischer Busen, Gulf of Botnia.
Bracara, Braga.
Brasilien, Brazil.
Brasilische Gebirge, Brazil Mountains.
Brasilische Strömung, Brazil Current.
Brasilisches Guyana, Brazil Guyana.
Braunschweig, Brunswick.
Brede Bugt, Bay of Brede.
Brienzer S., Lake of Brienzen.
Brigantium, Briançon.
Britannien, Gr. Britain.
Britisches Guyana, British Guyana.
Brivates Haf, Bay of Brest.
Brüssel, Brussels.
Brundisium, Brindisi.
Brundisium, Brindisi.
Bucephala, Ihylum.
Bucharest, Bukarest.
Bucharien, Bokhara.
Buchweizen, Buckwheat.

GLOSSARY—(Continued.)

Bucinarische In. Buccinarian Islands.
Bulgaren, Bulgari (tribe on the lower Danube).
Burdigala, Bordeaux.
Burgunder, Burgundians.
Busen von Bengalien, Bay of Bengal.
Busen von Cadix, Bay of Cadiz.
Busen Carpentaria, Bay of Carpentaria.
Busen v. Danzig, Bay of Dantzig.
Busen von Lepanto oder von Korinth, Gulf of Lepanto or of Corinth.
Busen v. Lion, Gulf of Lyons.
Busen v. Lübeck, Bay of Lubeck.
Busen von Panama, Bay of Panama.
Busen von Taranto, Gulf of Taranto.
Busen von Tehuantepec, Gulf of Tehuantepec.
Busen von Triest, Gulf of Trieste.
Busen von Venedig, Bay of Venice.
Byblos, Djebail.
Byzacium, Tunis.
Byzant., Constantinople.

C. d. guten Hoffnung, Cape of Good Hope.
C. Horner Strömung, Cape Horn Current.
Cabilonus, Chalons.
Cæsar Augusta, Saragossa.
Cætoberga, Setobal.
Cajeta, Gaeta.
Caledonien, Caledonia.
Caledonischer Canal, Caledonian Canal.
Calvadosfelsen, Calvados Rocks.
Canal oder La Manche, the British Channel.
Canal u. Strömung v. Mozambique, Channel and current of Mozambique.
Canal von Yucatan, Channel of Yucatan.
Canarische Inseln, Canary Islands.
Candriaces, Nugor River.
Canopus, Aboukir.
Cantabrisches Geb. 600 t., Santillanos Mountains 600 toises.
Cantal G., Cantal Mountains.
Cap Strom, Cape current.
Cap u. Ins. Breton, Cape and Island of Breton.
Cappadocien, Cappadocia.
Capsa, Wataras.
Capstadt, Cape Town.
Capverdische Inseln, Cape Verde Islands.
Caraisches Meer, Caribbean Sea.
Caralis, Cagliari.
Carenisches Gebirg, Sutherland Highlands.
Carmania, Kerman.
Carpathus, Scarpanto.
Carteja, Oceana.
Carthaginiensis Sinus, Gulf of Tunis.
Carthago, Carthage.
Carthago nova, Cartagena.
Casp. Engpässe, Caspian or Caucasian passes.
Caspisches Meer, Caspian Sea.
Caspisch. See liegt 33 t. unter d. Niveau d. Oceans, Caspian Sea, lies 33 toises lower than the level of the ocean.
Caspische See, Caspian Sea.
Cassiterides Ins., Scilly Islands.
Catalonien, Catalonia.
Celæne, Dingla.
Cerasus, Keresoun.
Cevennen, Cevennes Mountains.
Chalifat der Abassiden, Caliphate of the Abbasides.
Charolais Geb. Charolles Mountains.
Chemnis, Ekhnin.

GLOSSARY—(Continued.)

Cherson, Kherson.
Chersonesus, Cape Razatin.
Cheviot Gebirge, Cheviot Hills.
Chile, Chili.
China Wälder, Bathbark Forests.
Chinesisches Meer, Chinese Sea.
Chios, Scio.
Choco Kette, Choco Mountain Chain.
Chorasmia See, Lake Kharasm.
Chorasmii, Kharasm.
Churhessen, Electoral Hesse.
Cibalis, Palanha.
Cilicia, Itshili; *Die Cilicischen Thore*, the Passes of Itshili.
Cimbrische Halb I., Cimbrian Peninsula (Jutland).
Clearwater See, Clearwater Lake.
Cnossus, Macritichos.
Colchis, Mingrelia.
Colchischer G., Gulf of Mingrelia.
Colonia, Cologne.
Comana, Bostan.
Comer S., Lake of Como.
Comum, Como.
Conimbriga, Coimbra.
Constantinopel, Constantinople.
Constantinopolis, Constantinople.
Constanz, Constance.
Cooks Strasse, Cook's Strait.
Cophas, Guadel.
Cophes, Ghizni River.
Coptos, Ghouft.
Corecyra, Corfu.
Cordofan, Kordofan.
Corduba, Cordova.
Corps unter Hephæstion, Corps under Hephæstion.
Croatien, Croatia.
Croatische Militair Grenze, Croatian military frontier.
Curene, Kuren.
Curland, Courland.
Cydonia, Canea.
Cynopolis, Nesle Sheik Hassan.
Cybern, Cyprus.
Cyrene, West Barca.
Cyropolis, Enzellee.
Cyrus, Politica.
Cythere, Citria.
Cyzicus, Kyzik.

Dacia, Hungary and Transylvania.
Daenemark, Denmark.
Dakien, Dacia (Hungary).
Dalmatien, Dalmatia.
Dampfschiffe von Triest der Æstn. Lloyd Ges., Steamers of the Austrian Lloyd Company from Trieste.
Dänen, Danes.
Danubius, Danube River.
Danzig, Dantzig.
Daphne, Daia.
Dardanellen Schlösser, Palaces at the Dardanelles.
Dardanellen Str., Dardanelles.
Darnis, Derna.
Das Alpen Gebirge, the Alps.
Das Po Thal, the Po Valley.
Daurisches Alpenland, the Da Oural Alps (branch of the Oural Mountains).
Davis Strasse, Davis's Strait.

GLOSSARY—(Continued.)

Delphi, Castri.
Dembo Hochland, Dembo Highlands.
D'Entrecasteaux Spitze, Point d'Entrecasteaux.
Der Normannen Reiche, the Norman Empires.
Der Spiegel des todten Meeres liegt 220 t. tiefer als der Ocean, the surface of the Dead Sea lies 220 toises below the level of the ocean.
Der Wash, the Wash.
Dergh See, Lake Derg.
Dertosa, Tortosa.
Deutsche Meilen 15 auf den Grad, German miles 15 to the degree.
Deutsche unter Kaiser Friedrich II., Germans under Emperor Frederick II.
Deutsches Kaiserreich, German Empire.
Deva, Ayas.
Die Aleuten od. Catharinas Archipel, the Aleutian Islands or Catharine's Archipelago.
Die Aleutischen Inseln, the Aleutian Islands.
Die Azoren, the Azores.
Die bekannte Welt des Allerthums, the world known to the Ancients.
Die Carolinen, the Caroline Islands.
Die 3 Oder Mündn., the three mouths of the Oder.
Die Eols Grotten, the Grottoes of Æolus.
Die grosse osteuropäische Ebene in welcher kein Punkt die Höhe von 180 t. erreicht, the large East-European plain, in which no point reaches the height of 180 toises.
Die Nord See oder das deutsche Meer, the North Sea or the German Sea.
Die Ostsee, oder das Baltische Meer, the Baltic.
Die Philippinen, the Philippine Islands.
Die Schweiz, Switzerland.
Die sieben Kuhfrsten, the Seven Cowridges.
Diemtiger Th., Diemtig Valley.
Dinarisches Alpen Gebirg, Dinarian Alps (on the lower Danube).
Dio Adelphi (Die 2 Brüder), Dio Adelphi (The Two Brothers).
Dioscorides I., Island of Socotra.
Dioscurias, Iskuria.
District diesseits der Donau, District north of the Danube.
District diesseits der Theiss, District west of the Theiss.
District jenseits der Donau, District beyond the Danube.
District jenseits der Theiss, District beyond (east of) the Theiss.
Dobrudscher, Dobrodje.
Donau, Danube.
Donaumündungen, Mouths of the Danube.
Donauwörth, Donauwerth.
Donische Kosaken, Cossacks of the Don.
Dora Baltea, Doria Baltea River.
Drapsaea, Bamian.
Drontheim, Trondheim.
Dschebil el Kamar od. Mond Geb., Gebel Komri, or Mountains of the Moon.
Düna, Dvina River.
Dünkirchen, Dunkirk.
Durius, Douro River.
Durovernum, Canterbury.

Eblana, Dublin.
Eboracum, York.
Ebro Mündung, Mouth of the Ebro.

GLOSSARY—(Continued.)

Ebusus, Iviza.
Eisenbahnen, Railroads.
Eisenbahnkarte von Mitteleuropa, Railroad chart of Central Europe.
Eismeer, Arctic Ocean.
Eisstarre Sand u. Morast Fläche, Frozen Sand and Swamp Plain.
Elusa, Eauze.
Emerita Aug., Merida.
Emirat v. Cordova, Emirate of Cordova.
Enara See, Lake Enara.
Engländer unter Richard Löwenherz, the English under Richard Cœur de Lion.
Engl. Colonien am Schwanzfusse, K. Georg's Sund und N. S. Wales, English Colonies on Swan River, King George's Sound, and New South Wales.
Englische Meilen 69²²/₁₀₀ auf den Grad, English miles, 69²²/₁₀₀ to the degree.
Engpass v. Kaipha, Pass of Kaipha.
Ephesus, Ayasuluk.
Epidaurus, Ragusa Vecchia.
Epirus, Albania.
Eregli, Ereklî.
Erklärung der Zahlen, Explanation of the figures.
Erne See, Erne Loch.
Erymanthus, Mount Olonos.
Eskimos, Esquimaux.
Esthland, Esthonia.
Euböa, Negropont.
Euphrat, Euphrates.
Europa vor der Französischen Revolution, Europe before the French Revolution.
Europa zur Zeit der Kreuzzüge, Europe during the Crusades.
Europa zur Zeit Karls des Grossen, Europe at the time of Charlemagne.
Europäisch Sarmatien, European Sarmatia.
Europäische Besitzungen in Nord Guinea, European possessions in North Guinea.
Europäisches Russland, European Russia.
Europäisches Scythien, European Scythia.

Fadejewski, Fadevskoi.
Fær Æer, Faro Islands.
Falklands Ins., Falkland Islanas.
Falsche Bai, Bay of Falso.
Faltschi, Faltsi.
Fan Æ., Fano I.
Favonius (West), West Wind (Zephyr).
Feuerland, Terra del Fuego.
Finnischer Busen, Gulf of Finland.
Fischereien von Agoutinitza, Fisheries of Agoutinitza.
Fittre See, Bahr Fittre.
Flachs u. Hanf, Flax and Hemp.
Flandern, Flanders.
Flavia Cäsariensis, Central England.
Flaviobriga, Bilbao.
Flavionavia, Laviana.
Flevus, Flevo, Zuyder Zee.
Florentia, Florence.
Florenz, Florence.
Franken, Franconia.
Frankfurt, Frankfort.
Fränkisches Italien, Frankish Italy.
Fränkisches Plateau, Franconian plateau.
Frankreich, France.
Französ. Guyana, French Guyana.

GLOSSARY—(Continued.)

Französische Lieues 25 auf den Grad, French leagues 25 to the degree.
Franzosen unter Philipp August, The French under Philip Augustus.
Franzosen unter Ludwig IX., The French under Louis IX.
Freiburg, Freiburg.
Freie Indianer, Free Indians.
Freundschafts oder Tonga In., Friendly or Tonga Islands.
Friedens Fl., Peace River.
Frobischer Str., Frobisher's Strait.
Fuchs Ins., Fox Islands.
Fünen, Fyen.
Fuglœ, Bird Island.
Fürst. Benevent, Principality of Benevento.
Fürstenthum Neuburg, Principality of Neuburg.

Gabæ, Chavos.
Gades, Cadiz.
Gaditanum, Gibraltar.
Galatïa, Anadolia.
Galicien, Galicia.
Galizien, Galicia.
Gallien, Gallia (France).
Gallische Wegestunden wovon 50 auf den Grad, Gallic miles 50 to the degree.
Gangischer oder Indischer Golf, Bay of Bengal.
Garamantes, Fezzaneers and Tibboo (tribe).
Garda See, Lake of Garda.
Gaugamela, Kamalis.
Gaulos, Island of Goza.
Geb. v. Granada, Granada Mountains.
Gebirge von Auvergne, Mountains of Auvergne.
Gedros, Mekran.
Gelbes Meer, Yellow Sea.
Genf, Geneva.
Genfer See, Lake of Geneva.
Gent, Ghent.
Genua, Genoa.
Geographen B., Geographer's Bay.
Geogr. Meilen 15 auf den Grad, Geographical miles 15 to the degree.
Gepiden, Gepidæ (tribe).
Germanen, Germans.
Germanien, Germany.
Germanische Meer, North Sea.
Germanische Tiefebene, German Low Plain.
Gerste, Barley.
Gerste, Hafer, Roggen, Barley, Oats, Rye.
Gerste, Roggen, Kartoffeln und Buchweizen, Barley, Rye, Potatoes, and Buckwheat.
Gesellschafts In., Society Islands.
Gesoriacum, Boulogne.
Geten, Getæ (tribe).
Gletscher, Glacier.
Glückliches Arabien, Arabia Felix.
Gogana, Congoon.
Göksschai See, Lake Gokshai.
Goldener Chersonesus, Golden Khersonesus (Malaya).
Gordium, Sarilar.
Gorsynia, Atchicola.
Gothen, Goths.
Gr. Bären See, Great Bear Lake.
Gr. Minsh oder Caledonisches Meer, Great Minsh or Caledonian Sea.
Gr. Sclæven S., Great Slave Lake.
Grampian Gebirge, Grampian Mountains.

GLOSSARY—(Continued.)

Graubündner Alpen, Grison Alps.
Griechenland, Greece.
Griechisches Italien, Greek Italy.
Grönland, Greenland.
Gross Britannien und Ireland, Great Britain and Ireland.
Gross Phrygia, Phrygia Major.
Gross Russland, Great Russia.
Grösse Antillen, the larger Antilles (West India Islands).
Grosse Eskimos, Great Esquimaux.
Grosser Atlas, Mount Atlas.
Grosser oder Stiller Ocean, Pacific Ocean.
Grossherz. Hessen, Grand Duchy of Hesse.
Grüne Berge, Green Mountains.
Grünes Vorgebirge, Cape Verde.
Gürtel des Getreides, Zone of the grains.
Gürtel ohne Cultur, Zone without cultivation.
Guräus, Kamah River.
H. I. or Halbinsel stands for "Peninsula" before the respective names.
Haag, the Hague.
Habesch, Habesh.
Hadrianopolis, Adrianople.
Hæmus, Balkan Mountains.
Haf. v. or Hafen von stands for "Port of" before the respective names.
Hafer, Oats.
Hafer u. Gerste, Oats and Barley.
Hafer u. Weizen, Oats and Wheat.
Halbinsel Methana, Peninsula of Dara (Methana).
Halicarnassus, Boodroom.
Haliez oder Galizien, Galicia.
Han Hai (Südl. Meer), South Sea.
Harz Gb., Harz Mountains.
Hasen Ind., Hare Indians.
Haupt Äquatorial Strömung, Principal equatorial current.
Hauptstadt, Capital.
Hebräische Stadien wovon 750 a. d. Gr., Hebrew stadia 750 to the degree.
Hebriden oder Western Inseln, Hebrides or Western Islands.
Hecatompilos, Dangan.
Hedschas, Hedjas.
Heiliges Vgb., Promontorium Sacrum.
Heliopolis, Baalbec.
Hellas, Greece.
Hellespontus, Dardanelles.
Helsingör, Elsinore.
Heniochi, Tribe in Armenia.
Hermopolis, Eshmounein.
Hermunduren, Hermunduri (tribe in central Germany).
Herodots Erdtafel, Herodotus's Map of the World.
Heruler, Heruli (tribe in North Germany).
Herzogth. Sächsische Länder, Saxon Duchies.
Herzogthum, Duchy.
Hibernien, Hibernia.
Hinter Rhein, Hind Rhine (one of the rivulets tributary to the Rhine).
Hippo Regius, Bona.
Hispalis, Seville.
Hispanien, Spain.
Hoch Alp, High Alp.
Hoch Sudan, Soudah Mountains.
Hochland von Africa, Highlands of Africa.
Hohe Tatarei, Tartar Highlands.

GLOSSARY—(Continued.)

Hoher Atlas, Mount Atlas.
Hügelgruppe v. Sandomir, Group of Hills of Sandomir.
Hunds Ribben Ind, Dogrib Indians.
Hunigaren oder Ungrier, Hungarians.
Hydraotes, Ravee River.
Hypanis, Kuban River.
Hyphasis, Beyah River.
Hyrcania, Gyrgaun.
Hyrkanisch. Meer, Caspian Sea.
I., Ia., Ins., or Insel stands for "Island" before the respective names.
I. Helgoland, Island of Heligoland.
I. Kängurah, Kangaroo Island.
I. u. Stadt Cayenne, Island and Town of Cayenne.
Jacobs Thal, Jacob's Valley.
Jadera, Zarah.
Japanisches Meer, Sea of Japan.
Jasygien, Jassygia.
Jaxartes, Sihon River.
Jazygen (Sarmaten), Sarmatians.
Ibenes, Ebro River.
Iberia, Georgia.
Ichthyophagen, Fish-eaters.
Iconium, Konia.
Jenseits d. Ganges, Beyond the Ganges.
Jenseits d. Imaus, Beyond the Altai.
Jernis, Dunkerrin.
Illyricum, Illyria.
Illyrien, Illyria.
Im Sommer 15°, In the summer 66 degrees F.
Im Winter 5°, In the winter 43 degrees F.
Imandra See, Lake Imandra.
Imaus Geb., Altai Mountains.
Indischer Ocean, Indian Ocean.
Indsche Burun, Cape Indjeh.
Indus Mündn., Mouths of the Indus.
Ins. unter d. Winde, Caribbean Islands.
Ins. d. günen Vorgebirges, Cape Verde Islands.
Jomanes, Jumna River.
Ionische Inseln, Ionian Islands.
Joppe, Yaffa.
Joux See, Lake Joux.
Ipsus, Ipsilihissar.
Irgis, Irghiz River.
Irische See, Irish Sea.
Irland, Ireland.
Irtisch, Irtish River.
Is, Hit.
Isca, Exe River.
Island, Iceland.
Issedones, Mongolian tribe.
Ister (Donau), Danube.
Ister Mündn., Mouths of the Danube.
Italien, Italy.
Jülich, Juliers.
Jüten, Jutlanders.
Juliobriga, Reynosa.
Julische Alpen, Carnic or Julian Alps.
Jura Geb., Jura Mountains.
Jura Sund, Jura Sound.
Juvavia, Saltzburg.
K. Charlotte S., Queen Charlotte's Sound.
Kärnthen, Carinthia.
Kaiser Canal, Emperor's Canal.
Kaiserthum Oesterreich, Empire of Austria.
Kalmüken, Calmucks.

GLOSSARY—(Continued.)

Kamische Bulgaren, Kama Bulgarians.
Kandile, Canals.
Kanal von Bristol, Bristol Channel.
Kaptschak, Cabjak (tribe in Bokhara).
Karapta oder Sachalin, Caraphta or Sachalin.
Karazubazar, Kara Soo.
Karchedon, Carthage.
Karischer B., Bay of Caria.
Karmanien, Kerman.
Karolinen, Caroline Islands.
Karpathen 2000 t. mittl. Höhe, Carpathian Mountains 2000 toises mean height.
Karpathen Geb., Carpathian Mountains.
Karpathisches Waldgebirge, Carpathian Forest.
Kartagena, Cartagena.
Karthago, Carthage.
Kartoffeln u. Hafer, Potatoes and Oats.
Kartoffeln u. Buchweizen, Potatoes and Buckwheat.
Kaspisches Meer, Caspian Sea.
Kattegat, Cattegat.
Kaukasien, Caucasia.
Kaukasus Gebirge, Caucasian Mountains.
Kaukasische Steppe, Caucasian Steppes.
Keine Bäume ab. Graswuchs, No trees but grass.
Kelten, Celts.
Kemi See, Lake Kemin.
Kgn. Charlotte I., Queen Charlotte's Island.
Kimbrischer Cherson, Cimbrian Chersonesus (Jutland).
Kjölen Gebirge, Koelen Mountains.
Kirchenstaat, Papal States.
Kirgisen Horde, Kirghis Horde.
Kirghisen Steppe, Kirghis Steppes.
Kizil Ernak, Kizil Irmak River.
Kl. Antillen, Little Antilles (Caribbean Islands).
Kl. Karpathen, Little Carpathians.
Kl. Kumanien, Kis Kunsag.
Klein Phrygia, Phrygia Minor.
Klein Russland, Little Russia (Russian Province).
Kleinasien, Asia Minor.
Kleine Kirgisen Horde, Little Kirghis Horde.
Koblenz, Coblenz.
Köln, Cologne.
Kön. Georg Sund, King George's Sound.
König. Georg's I., King George's Islands.
Königin Charlotte Sund, Queen Charlotte's Sound.
Königreich stands for "kingdom" before the respective names.
Konäguen, Tribe of Esquimaux.
Kong Gebirge, Mountains of Kong.
Kopenhagen, Copenhagen.
Kosaken, Cossacks.
Krakau, Cracow.
Krym, Crimea.
Kuba, Cuba.
Kupfer Ind., Copper Indians.

L. I. Sund, Long Island Sound.
Ladoga See, Lake Ladoga.
Lakeneig, Lakeneigh.
Laminium, Alambra.
Lamose, Lamusa River.
Lampsacus, Lamsaki.
Lanai, Tribe in North Germany.
Lancerote, Lancerota Island.
Land der Finnen, Land of the Finns.
Land der kleinen Eskimos, Land of the dwarf Esquimaux.

GLOSSARY—(Continued.)

Larice, Larch.
Lauriacum, Loreh.
Lausitzer Gebirg, Lusatian Mountains.
Leba See, Lake Leba.
Leman S., Lake Lemman.
Leptis, Lebida.
Lerdalsöer, Lerdals Islands.
Lesbos, Mytilene.
Lessöewerk, Lessoe forge.
Leucas, Amaxiki.
Leuce, Island of Adasi.
Ljachen, Bohemians.
Libyen, Africa.
Libysche Wüste, Libyan Desert.
Lieukieu In., Loo Choo Islands.
Ligeris, Loire River.
Liguria, Genoa.
Ligurisches Meer, Gulf of Genoa.
Likeio In., Loo Choo Islands.
Lilybaum, Boe.
Lindum, Lincoln.
Liptauer Alp, Liptau Alps.
Lissus, Allessio.
Lithauer, Lithuania.
Litus Saxonum, Coast of Sussex.
Litwanen, Lithuania.
Livadien, Livadia.
Liviner Thal, Livin Valley.
Livland, Livonia.
Livorno, Leghorn.
Lixus, Luccos River.
Loja, Loxa.
Lombardei, Lombardy.
Lomond S., Lake Lomond.
Londinum, London.
Longobarden, Longobardi (Lombards).
Lucentum, Alicante.
Luceria, Lucera.
Lüneburger Heide, Luneburg Heath.
Lüttich, Liège.
Lugdunensis, North West France.
Lugdunum, Leyden.
Lugovallum, Carlisle.
Lugumkloster, Lugum Convent.
Lulea See, Lake Lulea.
Lumnitz B., Mount Lomnitz.
Lusitania, Portugal.
Lutitschen, Luititsi or Wilzi (Tribe in North Germany).
Luzern, Lucerne.
Lycaonia, N. W. Karamania.
Lyon, Lyons.
Lystra, Illisera.

Maas, Meuse River.
Maasstäbe, Scales.
Macedonien, Macedonia.
Mackenzie In., Mackenzie's Islands.
Macquarie In., Macquarie's Island.
Madgyaren, Magyars.
Mähren, Moravia.
Mährische Höhe, Moravian Highlands.
Mælar See, Lake Mælar.
Mæotis See, Sea of Azov.
Magelhaens Strasse, Straits of Magellan.
Mahadia, Mahedia.
Mahrah, Mahran.
Mailand, Milan.
Mainz, Mayence, Maynz.
Mais und Weizen, Indian Corn and Wheat.

GLOSSARY—(Continued.)

Makarjew, Makariv.
Mal Ström, Malstrom.
Malaca, Malacca.
Malmö, Malmo.
Malmysch, Malmish.
Malouinen, Falkland Islands.
Mandeln, Almonds.
Mandschurei, Manchooria.
Manytsch, Manich River.
Maraniten, Maranites, tribe in Arabia Felix.
Marcomannen, Marcomanni, tribe in S. E. Germany.
Mare Adriaticum, Adriatic Sea.
Mare Caspium, Caspian Sea.
Mare Erythræum (Indisches Meer), Indian Ocean.
Mare Hyrcanum oder Casptum, Caspian Sea.
Mare Internum (Mittelländisches Meer), Mediterranean Sea.
Marea, El Khreit.
Margaret In., Margaret's Island.
Margus, Murghab River.
Marianen od. Ladronen, Marian Islands.
Marinestunden 25 auf den Grad, Marine leagues 25 to the degree.
Marisus, Maros River.
Marmara Meer, Sea of Marmora.
Marschall Inseln, Mulgrave Islands.
Marseille, Marseilles.
Martyropolis, Meia Farekin.
Mascarenen Inseln, Mascarenhas Islands (Mauritius, Bourbon, &c.).
Massaga, Massa.
Massilia, Marseilles.
Mater, Matter.
Mauritania, Algiers.
Mauritanien, Algiers.
Maxima Cesariensis, Northern England.
Mb. v. Issus (Sinus Issilicus), Bay of Iskenderoon.
Meder, Medes (nation).
Mediolanum, Milan.
Medus, Abkuren River.
Meer Alpen, Maritime Alps.
Meer von Ochotsh, Sea of Okotsk.
Meer von Tarrakai, Gulf of Tartary.
Meerb. v. Californien, Gulf of California.
Meerb. v. Sues, Gulf of Suez.
Meerbusen von Mexico, Gulf of Mexico.
Meiningen, Meinungen.
Melgig Sumpf, Melgig Swamp.
Melitene, Malatia.
Memel od. Niemen, Meman River.
Memel Niederung, Tilsit Lowlands.
Memnis, Korkor Baba.
Memphis, Mangel Mousa, or Mit Raheni.
Meninx, Jerba Island.
Mergui In., Mergue Archipelago.
Meroe, Gibbainy.
Mesagna, Mesagne.
Mesembria, Missivri.
Mesopotamia, Al Gezira.
Messana, Messina.
Mettis, Metz.
Mexicanische Küstenströmung, Mexican Coast Current.
Miletus, Palatia.
Militär Colonien, Military Colonies.
Militair Grenze, Military Boundary.
Minus, Minho River.
Mjö See, Lake Mjö.

GLOSSARY—(Continued.)

Mioritz See, Lake Mioritz.
Mississippi Mündungen, Mouths of the Mississippi.
Mittelländisches Meer, Mediterranean Sea.
Mittlere Kirgisen Horde, Middle Kirghis Horde.
Mittlere Temperatur nach Celsius, Mean temperature according to Celsius.
Mittlere Temperatur nach Reaumur, Mean temperature according to Reaumur.
Mogontiacum, Mayntz.
Molukken, Molucca Islands.
Molukken Str., Molucca Passage.
Mond Gebirg, Mountains of the Moon.
Mongolei, Mongolia.
Monreale, Monreal.
Montagnes Noires, Black Mountains (Black Forest).
Mordwinen, Mordwines (tribe in Asiatic Russia).
Moreton C. u. B., Moreton Cape and Bay.
Moscha, Morebat.
Mosel, Moselle River.
Moskenasö, Mosken Island.
Moskau, Moscow.
Moskwa, Moscow.
Mosyneoci (tribe on the Black Sea).
Mozyr, Mozir.
Mühlhausen, Mulhouse.
München, Munich.
Mündung des Amazonen Stroms, Mouth of the Amazon River.
Mündung der Elbe, Mouth of the Elbe.
Mündung des Tajo, Mouth of the Tagus.
Murray Busen, Murray Firth.
Muthmassliche Grenze der den Alten bekannten Binnenländer von Afrika nach den Geographen Walkenaer und Gosselin, Probable boundary of the African inland known to the Ancients according to the geographers Walkenaer and Gosselin.
Mutina, Modena.

N. Schottl., North Scotland.
N. W. Ausflüsse des Äquatorial Stroms, Northwest termination of the Equatorial Current.
Nabathæer, Nabathæi (nation in Arabia).
Nadel Banck, Cape Agulhas.
Naissus, Nissa.
Namadus, Nerbuddah River.
Napeta, Mograt.
Narbona, Narbonne.
Narbonensis, Narbonne.
Nasamonen, Nasamones (tribe in West Barca).
Natal Küste, Natal Coast.
Narusa mit Hafer, Nausa, with port.
Nazareth Bank und Ins., Nazaret Bank and Island.
Neagh S., Lake Neagh.
Neapel (Neapolis), Naples.
Nelson Canal, Nelson Channel.
Nemausus, Nismes.
Nerbudda, Nerbuddah River.
Neu stands for "New" before the respective names.
Neu Californien, New California.
Neu Georgien, New Georgia.
Neu Helvetien, New Helvetia.
Neu Karthago, New Carthage.
Neu Scotia, Nova Scotia.
Neu Sibirien, New Siberia.
Neue Hebriden, New Hebrides.

GLOSSARY—(Continued.)

Neue Saline, New Saltwork.
Neuenburg, Neufchatel.
Neuenburger S., Lake of Neufchatel.
Neustrien, Neustria (the part of France lying between the Meuse, Loire, and the Atlantic Ocean).
Nicasia, Island of Karos.
Nicobaren, Nicobar Islands.
Nicomedia, Izmid.
Nieder Canada, Lower Canada.
Nieder Ungarische Ebene, Lower Hungarian Plain.
Niederl. Guyana, Dutch Guyana.
Niederlande, Netherlands.
Niger, Niger River.
Nil, Nile River.
Nil Mündungen, Mouths of the Nile.
Nilus, Nile River.
Nîmes, Nîmes.
Niphates Geb., Sepan Mountains.
Nizza, Nice.
Norba Casaria, Alcantara.
Nördlicher Oceanus, Arctic Ocean.
Nördlicher Polarkreis, Arctic Circle.
Nördlicher Wolga Rücken, Northern Volga Ridge.
Nördliches Eismeer, Arctic Ocean.
Nord stands for "North" before the respective names.
Nord Afrikanische Strömung, North African Current.
Nord Albingen, North Albingians (tribe in Holstein).
Nord Georgien, North Georgia.
Nord Georgien I., North Georgia Island.
Nord See, North Sea.
Noricum, Styria, Salzburg, &c.
Norische Alpen, Noric Alps.
Normanische Inseln, Normandy Islands (Guernsey, Jersey, Alderney, Sark).
Northlined S., Northlined Lake.
Norwegen, Norway.
Notium Vgb., Mizen Head.
Nuba See, Nuba Lake.
Nuba Sumpf, Nuba Swamp.
Nubier, Nubians (tribe).
Nubische Wüste, Nubian Desert.
Numidien, Numidia (East Algiers).
Nursa, Norcia.
Nymegen, Nîmègue.
Obdorisches Gebirge, Obdorsk Mountains (Northern extremity of the Oural Ms).
Ober See, Lake Superior.
Obi, Oby Island.
Obotriten, Obotrites (Vandal tribe in North Germany).
Oceanus Atlanticus, Atlantic Ocean.
Oceanus Germanicus, North Sea.
Ochus See, mit dem Kaspisches Meere früher wahrscheinlich zusammenhängend, Ochus Sea (Aral Sea), probably formerly connected with the Caspian Sea.
Odessus, Odessa.
Odysseus, Odessa.
Æ. L. v. Ferro, East longitude from the Island of Ferro.
Æ. L. v. Paris, East longitude from Paris.
Æca, Tripoli.
Ælbäume, Olive trees.

GLOSSARY—(Continued.)

Æsterreich, Austria.
Æsterreichische Alpen, Austrian Alps.
Æsterreichische Landestheile, Austrian dependencies.
Æstl. Gats, Eastern Ghauts.
Æstliche Länge von Ferro, East longitude from the Island of Ferro.
Æstliche Länge von Paris, East longitude from Paris.
Offene B., Open Bay.
Olisibon (Olisipo), Lisbon.
Olite, Olitite.
Olivenza, Olivenca.
Olympia, Miracca.
Olympische Stadien wovon 600 a. d. Grad, Olympic stadia, 600 to the degree.
Onega See, Onega Lake.
Ophiusa, Island of Formentera.
Orange od. Gariep, Orange or Gariep River.
Orangen, Oranges.
Orbelus, Mt. Gliubotin.
Orchoe, Bassora.
Oregon oder Felsen Gebirge, Rocky Mountains.
Oregon od. Columbia, Columbia River.
Orinoco Münd., Mouth of the Orinoco.
Orkaden, Orkney Islands.
Orscha, Orsha.
Orsova, Orsova.
Ortles Sp., Ortler Spitz.
Ortospanum, Kandahar.
Osca, Huesca.
Osmanisches Asien, Ottoman Asia.
Osmanisches Reich, Ottoman Empire.
Ossa, Mount Kissovo.
Ossadie (tribe in India).
Ost stands for "East" before the respective names.
Ost Küste von Brasilien, East Coast of Brazil.
Ost Preussen, East Prussia.
Ost Pyrenæen, East Pyrenees.
Ost See, Baltic.
Ost Römisches Kaiserreich, East Roman Empire.
Ostphalen, Eastphalians (tribe of the Saxon nation).
Ostracine, Ras Straki.
Ostrogothen, Ostrogoths.
Othrys Gebirg, Othrys (Hollovo) Mountains.
Ottomaken, Ottomak Indians.
Oxus, Amoo River.
Oxyrynchus, Behenese.
Oxydraces, Oxydracæ (tribe in Moulton).
Ozark Gebirg, Ozark Mountains.
P. Gr. d. Getreides u. d. Zone d. Regens, Polar boundary of grain and of the zone of rain.
P. Gr. d. Weines u. d. europäisch. tropen. Getreides, Polar boundary of the grape vine and of European tropical grain.
Padua, Padova.
Padus, Po River.
Pæstum, Pesto.
Palästina, Palestine.
Palibothra (Palimbothra), Patna.
Palks Strasse, Palk's Straits.
Palmyra oder Tadmor, Palmyra or Tadmor.
Palus Mæotis, Sea of Azov.
Pamphylia, S. E. Anadolía.
Pandosia, Mendicino.
Pannonia, Hungary.
Pannonien, Hungary.
Panormus, Raphti.

GLOSSARY—(Continued.)

Panticapæum, Kertch.
Paphlagonia, N. E. Anadolia.
Parhos, Baffa.
Parætonium, Al Bareton.
Parisii, nation in North France.
Paropanusus Geb., Hindoo Koosh.
Parthia, Province in Khorasan and N. E. Irak.
Parthiscus (Tibiscus), Theiss River.
Pasargadæ (Persepolis), Istakar.
Pastona, Pasten.
Patagonien, Patagonia.
Patagonische Kette, Patagonian Cordilleras.
Pax Julia, Beja.
Pella, Allahkilissia.
Pelopones, Morea.
Pelusium, Tineh.
Penninische Alpen, Pennine Alps.
Pentapolis, Chittagong.
Pentland Strasse, Pentland Firth.
Pergamus, Pergamo.
Pers. Golf, Gulf of Persia.
Persien, Persia.
Persische Parasangen, wov. 25 a. d. Gr., Persian Parasangs, 25 to the degree.
Persischer M. B., Gulf of Persia.
Peruanische Strömung, Peruvian Current.
Petschenegen, Petschenegs (Tartar tribe).
Peucetia, Terra di Bari.
Peuciner, Peucini (tribe in Galicia, &c.).
Phanagoria, Tmutarakan.
Pharsalus, Pharsala.
Pharselis, Tekrova.
Phazania, Fezzan.
Philippi, Filibah.
Philippinen, Philippine Islands.
Philippopel, Philippopolis.
Phocæa, Fokies.
Phryger, Phrygians (nation in Anadolia).
Physikalische Karte von Europa (— *Afrika*, — *Asien*, — *Nord America*, — *Süd Amerika*), Physical map of Europe (— *Africa*, — *Asia*, — *North America*, — *South America*).
Pictavi (nation in Gallia Aquitania).
Picten, Picts (nation in Scotland).
Pielis See, Lake of Pielis.
Pindus Mn., Agrafta and Smocovo Mountains.
Pisidia, S. E. Anadolia.
Pithyusen (Pityusæ), Islands of Iviza, Formentera, &c.
Pityus, Soukoun.
Pitkarainen, Pitcairn's Island.
Plateau v. (or *von*) stands for "Plateau of" before the respective names.
Plateau von Ost Galizien, Plateau of East Galicia.
Plattkopf Indr., Flathead Indians.
Podolien, Podolia.
Polänen, Polænæ (Slavonic tribe).
Polargr. d. Bäume, Polar boundary of trees.
Polargr. d. Moose u. Beeren, Polar boundary of mosses and berries.
Polargr. d. Obstbaumes, Polar boundary of fruit trees.
Polargr. d. Elbaumes, Polar boundary of the olive tree.
Polargr. d. Weinstocks, Polar boundary of the grape vine.
Polargrenze, Polar boundary.
Polargrenze d. Banane u. d. tropischen Getreides, Polar boundary of the banana and of the tropical grain.

GLOSSARY—(Continued.)

Polargrenze des Getreides, Polar boundary of grain.
Polargrenze d. Palmen, Polar boundary of palm trees.
Polargrenze d. Weinstocks u. d. europäisch. trop. Getreides, Polar boundary of the grape vine and of the European tropical grain.
Polar Kreis, Arctic (or Antarctic) Circle.
Polen, Poland.
Polesiens Urwälder u. Sümpfe, Primitive forests and swamps of Polesia (now Minsk in Russia).
Pommern, Pomerania.
Pompelo, Pampeluna.
Pont. Eux. (Pontus Euxinus), Black Sea.
Pontinische In., Ponza Islands.
Pontus, N. E. Bulgaria.
Pontus Euxinus (*Schwarzes Meer*), Black Sea.
Porata, Pruth River.
Portland Sp., Portland Point.
Prag, Prague.
Prairien, Prairies.
Premnis, Cas. of Ibrim.
Pr. Holland, Prussian Holland (district in East Prussia).
Preussen, Prussia.
Preussische Landestheile, Prussian districts.
Preussische Höhe, Prussian Plateau.
Prophtasia (Prophthasia), Dookshak.
Propontis, Sea of Marmora.
Pskow, Pskov.
Psyllen, Psylli (tribe in N. Africa).
Ptolemäische Erdtafel, Map of the world according to Ptolemy.
Ptolemäische Stadien wovon 700 auf den Grad, Ptolemæan stadia 700 to the degree.
Pudosh, Pudog.
Pura, Pureg.
Purpur Ins., Purpureæ Insulæ (probably Salvage Islands).
Putea, Fuentes.
Putziger Wiek, Bay of Putzig.
Pyrenæi, Pyrenees.
Pyrenäen, Pyrenees.
Pyreneos Geb., Pyrenees.

Quaden, Quadi (nation in Hungary).
Quadra u. Vancouvers I., Vancouver's Island.
Querimbe, Querimba.

Rathenow, Rathenau.
Ratiaria, Arcer Palanka.
Rauhe Alp, Rauhe Alpe.
Rauraci, Tribe in Alsace.
Rch. d. Picten, Kingdom of the Picts.
Ree See, Lake Ree.
Regen Fluss, Rain River.
Regen S., Rain Lake.
Regenloses Gebiet, Rainless territory.
Regensburg, Ratisbon.
Reich der Aglabiten, Kingdom of the Aglabites (dynasty of Ibrahim ben Aglab).
Reich Alexanders des Grossen, Empire of Alexander the Great.
Reich der Bulgaren, Empire of the Bulgarians.
Reich der Chazaren, Empire of the Chazares (nation in East Russia).
Reich Karls d. Gr., Empire of Charlemagne.
Reich des Porus, Kingdom of Porus (in India).
Reich der Seleuciden, Kingdom of the Seleucidæ (dynasty of Seleucus).

GLOSSARY—(Continued.)

Reich der Slaven, Empire of the Slavonians.
Reiche d. Angelsaxen, Anglo-Saxon Possessions.
Reiche d. Briten, Possessions of the Britons.
Reiche d. Dänen, Possessions of the Danes.
Reiche d. Scoten, Possessions of the Scots.
Reis und Kaffee, Rice and Coffee.
Reis und Mais, Rice and Indian Corn.
Republik Genua, Republic of Genoa.
Republik Venedig, Republic of Venice.
Reus, Reuss.
Reval, Revel.
Rha (Volga), Rha (Volga).
Rhätische Alpen, Rhætian Alps.
Rhage, Rha.
Rhein, Rhine River.
Rhein Bayern, Rhenish Bavaria.
Rhegium, Reggio.
Rheims, Reims.
Rhenus, Rhine.
Rhoda, Rosas.
Rhodanus, Rhone River.
Rhodus, Rhodes.
Rhön Gb., Hohe Rhöne Mountains.
Rhoxolanen, Rhoxolani (Sarmatian tribe).
Römisch Deutsches Kaiserreich, Romano-Germanic Empire.
Römische Meilen wovon 75 auf den Grad, Roman miles 75 to the degree.
Römisches Reich, Roman Empire.
Römisches Reich zur Zeit Constantins des Grossen, Roman Empire in the time of Constantine the Great.
Roggen, Gerste, Weitzen, Rye, Barley, Wheat.
Roggen u. Gerste, Rye and Barley.
Roggen und Weitzen, Rye and Wheat.
Rom, Rome.
Roma, Rome.
Roths od. Erythräisches Meer, Red Sea.
Roths Meer od. Arabischer Meer, Red Sea.
Rotomagus, Rouen.
Roxolanen, Roxolani (Sarmatian tribe).
Rückkehr der Flotte unter Nearch, Return of the fleet under Nearchus.
Rücklaufende Strömung, Counter current.
Ruinen v. Babylon, Ruins of Babylon.
Ruinen von Carthago, Ruins of Carthage.
Ruinen v. Palmyra, Ruins of Palmyra.
Ruinen v. Susa, Ruins of Susa.
Rumanier, Rumeni (tribe in Bulgaria, Moldavia, and Moravia).
Rusadir, Melilla.
Rusicada, Stora.
Ruspa, Sbea.
Russische Werste 104.3 auf den Grad, Russian Wersts 104.3 to the degree.
Russisches America, Russian America.
Russlands beste Kornfelder, Russia's best grain-fields.
Rusucurum, Kolehah.

Saas Thal, Saas Valley.
Sabier, Sabians (St. John the Baptist's disciples; sect in Persia).
Sachalites Golf, Bay of Seger.
Sachsen, Saxony.
Sächsische Schweiz, Saxonian Switzerland.
Saguntum, Murviedro.
Saima S., Lake Saim.
Saker, Sakr.
Salamis, Coulouri.

GLOSSARY—(Continued.)

Salmantica, Salamanca.
Salomons Ins., Solomon Islands.
Saloniki, Salonica.
Salz Seen, Salt Lakes.
Salz Wüste, Salt Desert.
Sambus, Chumbul River.
Samojeden, Samoyedes.
Samoa oder Schiffer In., Navigators' Islands.
Samosate, Samisat.
Samsun, Samsoun.
Sandw. Cobi od. Hanhai, Desert of Cobi.
Sand Wüste, Sandy Desert.
Sangarius, Sakariah River.
Sarazenen, Saracens or Moors.
Sardes, Sart.
Sardica, Sophia.
Sardinien, Sardinia.
Sariphi Geb., Shar Mountains.
Sarmatæ, Sarmatians.
Sarmatien, Sarmatia.
Sarmatische Tiefebene, Sarmatian Lowland (East Prussia, Poland, and part of Russia).
Sarmatisches Meer, Sarmatian Sea (part of the Baltic).
Sarnia, Island of Guernsey.
Satala, Shaygran.
Sauromaten, Sarmatians.
Saxen, Saxony (Saxonians, Saxons).
Scandinavisches Meer, Scandinavian Sea.
Schettland In., Shetland Islands.
Schlangen Indr., Snake Indians.
Schlesien, Silesia.
Schloss v. Romelli, Romelli Castle.
Schnee Alp, Snowy Alps.
Schotland, Scotland.
Schwäbische Alp, Suabian Mountains.
Schwarzes Meer 52 t. tief, Black Sea 52 toises deep.
Schwarzw. (ald), Black Forest.
Schweden, Sweden.
Schweden, Norwegen und Dänemark, Sweden, Norway, and Denmark.
Schwedische Landestheile, Swedish districts.
Schweiz, Switzerland.
Slaven K. (üste), Slave Coast.
Scodra, Scutari.
Scordisci, tribe in Slavonia.
Scythopolis, Bysan.
Scupi, Uskup.
Scylacium, Squillace.
See, Sea or Lake.
See Alpen, Maritime Alps.
See Alpen von Californien, Maritime Alps of California.
See Alpen der Nord West Küste, Maritime Alps of the N. W. Coast.
See Arsissa, Lake Van.
See Küsten Kette v. Venezuela, Sea coast mountain chain of Venezuela.
See Likari, Lake Likaris.
Seehunds B., Seal's or Shark's Bay.
Seeland, Zealand.
Seemeilen 20 auf den Grad, Sea miles 20 to the degree.
Segobriga, Segorbe.
Seliger S., Lake Seligero.
Selinus, Vostizza River.
Senegambien, Senegambia.
Senogallia (Lugdunensis quarta), Isle of France and Champagne.

GLOSSARY—(Continued.)

Senus, Shannon River.
Septentrio (Nord), North.
Septimanen, Septimani (tribe in Languedoc).
Serbien, Servia.
Sesamus, Amasserah.
Setuval, Setubal.
Sevennen, Cevennes Mountains.
Seyschellen Ins., Seychelle Islands.
Shetland Inseln, Shetland Islands.
Shin See, Shin Lake.
Sicilia, Sicily.
Sidodona, Shenaas.
Sidon, Sayda.
Siebenbürgen, Transylvania.
Siebenbürgisches Plateau, Plateau of Transylvania.
Siena, Sienna.
Siga, Takumbreet.
Signia, Segni.
Sil, Sile River.
Simferopol, Taurida.
Simmen Thal, Simm Valley.
Singaglia, Sinigaglia.
Singara, Sinjar.
Singidunum, Belgrade.
Siniope, Sinub.
Sinus Arabicus, Red Sea.
Sirmium, Alt Schabacz.
Siscia, Sziszek.
Sitacus, Sita R hegian River.
Sitife, Seteef.
Skagerak, Skager Rack.
Skagestrandsbugt u. Handelsted, Skager Beach Bay and Commercial Town.
Skandien (Scandia), Sweden.
Skythen, Scythians (nation).
Skythini (Scythini), probably Saracens in Armenia.
Slaven, Slavonians.
Slavonische Militair Grenze, Slavonian military frontier.
Slowenen, Wends (Slavonic nation).
Sogdiana, Great Bukaria.
Sogdianien (Sogdiana), Great Bukaria.
Solanus (Ost), East.
Soledad od. Ost I., Soledad or Eastern Island (Falkland Islands).
Soli, Mezetlu.
Soraben, Sorbi (Slavonic tribe).
Span. Mark, Spanish mark (modern Catalonia, Navarre, and part of Arragonia).
Spanien, Spain.
Speier, Speyer.
Spoletum, Spoleto.
St. Georgs Kanal, St. George's Channel.
St. Johann, St. John.
Staaten der Mexicanischen Union, States of the Mexican Union.
Staaten der Nordamerikanischen Union, States of the North American Union.
Staateland, Staten Island (S. A.).
Stadt der Getæ, City of the Getæ.
Stalaktiden Grotte, Stalactite Grotto.
Steyermärk, Styria.
Str. v. (*Strasse von*) stands for "Straits of" before the respective names.
Strabo's Erdtafel, Map of the World according to Strabo.
Strasse v. Calais, the British Channel.
Strom und Gebirgs-System von Mitteleuropa,

GLOSSARY—(Continued.)

River and Mountain System of Central Europe.
Südamerika, South America.
Süd Atlantische Strömung, South Atlantic Current.
Süd Cap, South Cape.
Süd Georgien, South Georgia.
Südl. Continent, Southern Continent.
Südl. Grenze des Weinstocks, Southern boundary of the grape vine.
Südliche Verbindungs Strömung, Southern Connecting Current.
Südlicher Polarkreis, Antarctic Circle.
Süd oder Neu Georgien, South or New Georgia.
Süd Schetland, New South Shetland.
Süd West, South West.
Sümpfe in gleicher Höhe m. d. Ocean, Swamps on a level with the ocean.
Sumpf, Swamp.
Sund, Sound.
Sunda See, Sea of Sunda.
Sunda Strasse, Straits of Sunda.
Susiana, Khuzistan and Louristan.
Swilly See, Lake Swilly.
Sybaris, Cochyle River.
Syracusa, Syracuse.
Syrdaria, Sir River.
Syrien, Syria.
Syrisch Arabische Wüste, Syro-Arabian Desert.
Syrische Wüste, Syrian Desert.
Syrtes, Gulf of Sidra.
Syrtika (Seli or Psylli), in Tripolis.
Tabor, Mt. Tor.
Tabraca, Tabarca.
Tacape, Cables.
Tafelland von Armenien 250 t., Armenian Plateau 250 toises.
Tafelland von Iran 650 t. üb. d. Meere, Plateau of Iran 650 toises above the level of the sea.
Tafelland v. Mexico od. Anahuac, Plateau of Mexico or Anahuac.
Taifalen, Taifalæ (tribe on the Danube).
Tajo, Tagus River.
Tambow, Tambov.
Tamesis, Thames River.
Tanais (Danaber), Don River.
Tape, Bostam.
Tapes Ind., Tappe Indians.
Taprobana, Ceylon.
Turnowitzer Höhe, Plateau of Turnowitz.
Tarsus, Tersoos.
Tarum, Tarem.
Tatra Gebirg, Tatra Mountains (part of the Carpathian Ms.).
Taurica, Crimea.
Taurien, Tauria.
Taurischer Cherson, Crimea.
Tazila, Attock.
Tay Mündung, Firth of Tay.
Teate, Chieti.
Telmissus, Maery.
Tenerifa, Tenerife.
Termessus, Schenet.
Teufels Inseln, Devil's Islands.
Thapsacus, Der.
Thebais, Upper Egypt.
Theben, Thebes.
Thebunte, Melhafa.
Themse, Thames River.

GLOSSARY—(Continued.)

Therwinger, Thervingi (Gothic tribe).
Thessalonica, Salonica.
Thracia, Rumilia.
Thrakien (Thracia), Rumilia.
Thuner See, Lake of Thun.
Tiberis, Tevere River.
Tief Sudan, Low Soudan.
Tiefland von Afrika, Lowlands of Africa.
Tingis, Tangiers.
Tischit, Tisheet.
Titianus, Tezzano.
Titicaca See, Lake Titicaca.
Todtes Meer, Dead Sea.
Toletum, Toledo.
Tomi, Tomisvar.
Torneo See u. Elf, Tornea Lake and River.
Torres Strasse, Torres' Strait.
Toscana, Tuscany.
Toskanisches Hochland, Tuscan Highlands.
Transylvanische Alpen, Transylvanian Alps.
Trapezunt, Trebisonde.
Trapezus, Trebisonde.
Trematische In., Tremiti Islands.
Tridentum, Trento.
Trier, Treves.
Triest, Trieste.
Trileucum, Ortegal.
Troglodyten, Troglodytes (tribe on the Red Sea).
Tschad See, Lake Tchad.
Tscheremissen, Tchermisses (Finnish tribe in Russian Asia).
Tscherkessien, Circassia.
Tschernomorische Kosaken, Cirmomorian Cossacks.
Tschuktschen, Tchookches (tribe in N. E. Asia).
Türkei, Turkey.
Türkisch Croatien, Turkish Croatia.
Tunes, Tunis.
Tungusen, Tungouski (nation in Asia).
Turin, Turin.
Turkmanen, Turcoman (Tartar tribe).
Tusculum, Frascati.
Tyana, Kiliss Hissar.
Tyras, Dniestr River.
Tyras Donaster, Dniestr River.
Tyroler Alpen, Tyrol Alps.
Tyrrhenen, Tyrrheni (Pelasgian tribe).
Tyrrhenisches Meer, Tyrrhenian Sea (part of the Mediterranean).
Tyrus, Soor.
Umgebung von Neu York, Vicinity of New York.
Unerforschte Alpengebirge, Unexplored Mountain Region.
Ungarisches Erzgebirge, Hungarian Erzgebirge.
Ungarn, Hungary.
Unterirdische Wasserleitung, Subterranean Aqueduct.
Unzugängliche Felsenküste, Inaccessible rocky coast.
Ural Gebirge, Oural Mountains.
Uralische Kosaken, Oural Cossacks.
Urumija See, Lake Uromija.
Usa, Ouse River.
Ursprung der Peruanischen Küsten Ström. kalten Wassers, Origin of the Peruvian cold water current.
Uzen, Cumanen oder Polowzer, Utse Camanes or Polovzi (Mongolian tribe).

GLOSSARY—(Continued.)

Vandalen, Vandals (Gothic tribe).
Vanille u. Cacao, Vanilla and Cacao.
Vaterland des Kaffeebaumes, Country of the Coffee tree.
Veldidena, Wilden.
Venedicus Sinus, Gulf of Venice.
Venedig, Venice.
Venetæ, Venetes (tribe in Britany).
Veneten, Venetes (tribe in Britany).
Venetia, Venice.
Vereinigte Staaten, United States.
Verschiedene Ind. Stämme, Various Indian tribes.
Vesuv, Vesuvius.
Vgb. Comaria, Cape Comorin.
Vgb. Maceta, Cape Musseldom.
Vgb. Prionotus, Point Comol.
Vgb. Syagros, Cape Ras Vire.
Viadrus, Oder River.
Viennensis, Dauphiny.
Vierwaldstädter See, Lake of Lucerne.
Vindhy Kette, Vindhya Mountains.
Vindobona, Vienna.
Virunum, Waren.
Visurgis, Weser River.
Vogesen, Vosges Mountains.
Volhynien, Volhynia.
Volubilis, Pharaoh's Castle.
Vorder Rhein, Fore Rhine (one of the rivulets tributary to the Rhine).
Vorgeb Aromata, Cape Guardafui.
Vorgeb Simylla, Cape Simylla.
Votiaken, Wotyaks (Finnish tribe).
Wälder S., Lake of the Woods.
Wahabiten, Wahabites (Mahomedan sect).
Walachei, Walachia.
Waldai Geb., Waldai Mountains.
Walisch B., Whale Bay.
Wallachisches Tiefland, Wallachian Lowlands.
Wallenstädter See, Lake of Wallenstadt.
Wan See, Lake Van.
Wanger Oge, Wanger Oog.
Warasdiner Geb., Warasin Mountains.
Warschau, Warsaw.
Weichsel, Vistula River.
Weichsel Niederung, Vistula Lowlands.
Weisse Bai, White Bay.
Weisse Berge, White Mountains.
Weisse Bulgaren, White Bulgarians.
Weisses Meer, White Sea.
Weisses Vorgeb., Cape Blanc.
Weitzen, Gerste u. Hafer, Wheat, Barley and Oats.
Weitzen, Mais und Baumwolle, Wheat, Indian Corn and Cotton.
Weitzen u. Baumwolle, Wheat and Cotton.
Weitzen u. Reis, Wheat and Rice.
Wendekreis des Krebses, Tropic of Cancer.
Wendekreis des Steinbocks, Tropic of Capricorn.
Wenden, Wends (Slavonic tribe).
Wenern See, Lake Wenern.
Wesigothen, Visigoths (nation).
Weser Gb., Weser Mountains.
West Gats, West Ghauts.
West Indien, West Indies.
West Preussen, West Prussia.
West Pyreniden, West Pyrenees.
West Russland, West Russia.
Wester W., Wester Wald.

GLOSSARY—(Continued.)

Westliche Länge von Paris, W. Longitude from Paris.
Westphalen, Westphalia.
Wettern See, Lake Wettern.
Wien, Vienna.
Wilde Völker, Savage nations.
Windtafel der Griechen nach Aristoteles, Wind-chart of the Greeks according to Aristotle.
Windtafel der Römer nach Vitruvius, Wind-chart of the Romans according to Vitruvius.
Winipeg S., Winnipeg Lake.
Winipigoos S., Lake Winnipigoos.
Wogulen, Woguls or Uranfi (Finnish tribe).
Woiga, Volga River.
Wüste al Ahkaf, Desert Al Ahkaf.
Wüste Hochebene, Sandy Plateau.
Wüste Kharasm, Desert of Kharasm.
Wüste Sahara, Desert of Sahara.
Wüste Sahel, Desert of Sahel.
Wüsten Arabien, Arabia Deserta.
Zacynthus, Zante.
Zadracasta, Goorgaun.
Zagrus Geb., Aiagha Mountains.
Zahn u. Elfenbein K., Ivory Coast.
Zalissa, Tiflis.
Zana See, Lake Zana.
Zembre S., Lake Zembo.
Zariaspa später Baetra (Zariaspa, later Baetra), Balkh.

GLOSSARY—(Continued.)

Zeiton, Zeitoun.
Zenobia, Zelebi.
Zephyros (West), West wind.
Zerstückelung des Reiches, Dismembering of the Empire.
Zimmt, Muskatnuss u. Gewürznelke, Cinnamon, Nutmeg, and Clove.
Zoromba, Dustee River.
Zucker, Sugar.
Zucker, Kaffee, Thee, Sugar, Coffee, Tea.
Zucker u. Kaffee, Sugar and Coffee.
Züricher See, Lake of Zurich.
Zug unter Gottfried von Bouillon, Crusade under Godfrey of Bouillon.
Zug unter Conrad III. u. Ludwig VII., Crusade under Conrad III. and Louis VII.
Zug unter Ludwig IX. v. Frankr., Crusade under Louis IX. of France.
Zug unter Friedrich Barbarossa, Crusade under Frederick Barbarossa.
Zug unter Kaiser Friedrich II., Crusade under Emperor Frederick II.
Zug unter Richard I. u. Phil. August, Crusade under Richard I. and Philip Augustus.
Zuyder See, Zuyder Zee.
Zwarte Bge., Black Mountains.
Zweibrücken, Bipont.
Zwischen 0° und 10°, Between 0° and 10°.

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G E O G R A P H Y .

PLATES 1—44.

GEOGRAPHY is the science which treats of the surface of the earth. Three branches of geography are usually distinguished, according to the different points from which it is viewed, viz., Mathematical, Physical, and Civil. Mathematical (sometimes called Astronomical) Geography treats of the earth as a part of the solar system, investigating its size, shape, orbital and rotatory motions, and its relation to other heavenly bodies; it may therefore be considered as part of Astronomy. Physical Geography treats of the natural features of the earth, of the dry land and sea, of the fresh waters, and of the atmosphere encompassing it, the part having reference to the latter (Meteorology) being often thrown into connexion with Natural Philosophy or Physics, as we have done (see vol. i. p. 184). Finally, Political Geography considers the earth as the habitation of mankind, and accordingly treats of the division of its surface into states and countries; of the different towns, villages, and works of art; of the various races and tribes, with their dialects, religion, and government, and manner of life in general. Mathematical and Physical Geography, taken together, may be called *General Geography*, as distinguished from Political or *Special Geography*. To the latter belongs also, in fact, *Historical Geography*, which has reference to the condition of geographical science at different epochs, as well as to the political divisions and arrangements of the earth at different times.

A. GENERAL GEOGRAPHY.

PLATES 1—8.

The most important facts in respect to Mathematical Geography having already been presented under the head of Astronomy, we shall here be very brief in reference to this subject. That the earth is round, differing but little in shape from a sphere, has already been mentioned; also, that it turns once in twenty-four hours on an axis, the extremities of which are called respectively the North and South Poles. That great circle of the earth's surface to which her axis stands perpendicular, is called the Equator; every point of this is equally distant from either pole, and the whole circle divides the earth into two hemispheres, a Northern and a Southern. All circles

parallel to the equator are parallel circles, or parallels of latitude. Great circles passing through both poles are called Meridians. The geographical latitude of a place is its angular distance from the equator, measured along a meridian; it will be north or south as the place is north or south of the equator. The geographical longitude of a place is that arc of the equator intercepted between two meridians, one passing through the place and the other through the arbitrary point to which the longitude is referred. This latter meridian is called the first or fixed meridian, and differs in different countries. The French take as their first meridian the one passing through the observatory at Paris; the Germans make use of the meridian of Ferro, 20° west of that at Paris, and passing near the island of Ferro. The English make all references to the meridian of Greenwich, $17^\circ 46'$ east of that of Ferro, as do the Americans also. In this country, however, an effort has recently been made to have a meridian of our own, passing through the city of New Orleans, as most convenient on account of its being as nearly as possible 90° west of Greenwich. Our maps are drawn with reference to the meridian of Ferro, but for greater convenience we shall use the meridian of Greenwich in the body of the work. Longitude may be reckoned either west and east to the amount of 180° each, or entirely west to 360° . The two circles of latitude at distances of $23\frac{1}{2}^\circ$ on each side of the equator, are called the Tropics (the northern is the Tropic of Cancer, the southern the Tropic of Capricorn): the Polar or Arctic circles are those circles of latitude $23\frac{1}{2}^\circ$ from each pole, the northern parallel being the Arctic, the southern the Antarctic circle. These four circles divide the earth into five zones: one torrid, two temperate, and two frigid. The torrid zone is bounded by the two tropics, and embraces all that part of the earth where the rays of the sun fall vertically once or twice a year. The north frigid zone lies within the Arctic circle, the south frigid zone within the Antarctic; both together include that portion of the earth where the sun, during the summer, does not fall below the horizon for from twenty-four hours to six months, and during winter does not pass above the horizon for the same limits of time. Each of the temperate zones lies between the tropic and polar circles of its hemisphere. The two temperate zones together include more than half $\frac{5}{8}$ of the entire surface of the earth, the torrid embracing $\frac{4}{8}$, and the two frigid only $\frac{3}{8}$.

The equator, like any other circle, is divided into 360° , the sixteenth part of a degree, or one minute, being called a geographical mile. The entire circumference of the earth at the equator will therefore be 21,600 geographical miles, the diameter being $6875\frac{1}{2}$. Were the earth a perfect sphere, then, her surface would amount to about 148,512,000 square miles, and her volume to 170,176 millions of cubic miles. Measurements, however, carried on at various times, and in various places, within the last one hundred years, have shown that degrees of the meridian are not of the same length at all latitudes, but that they increase slightly from the equator towards the poles; it has hence been concluded that the earth in all strictness is not a sphere, but an elliptical spheroid, flattened or depressed at the poles, or in other words, is such a body as would be produced by the

rotation of an ellipse about its minor axis. Nevertheless, the difference between the greatest and least diameters of the earth, or the oblateness, amounts only to about $\frac{1}{303}$ of the former (the equatorial), or to about twenty-six statute miles. The following table expresses the dimensions of the earth, as given in English statute miles :

| | |
|----------------------------------|---------|
| Radius at the equator, . . . | 3962.6. |
| Radius at the pole, . . . | 3949.6. |
| Mean radius, or at 45° latitude, | 3956.1. |
| Mean length of a degree, . . | 69.05. |
| The fourth part of a meridian, | 6214.2. |

The length of an English geographical mile is equal to about 2025 yards. As the statute mile is 1760 yards, the ratio between the two is as 1 : 1.15. The Germans count fifteen geographical miles to the degree. Consequently one German geographical mile is equal to four English ditto ; and one German geographical mile equals 4.6 English statute or ordinary miles. The squares of these values expressing square miles will then be to each other as 1 to 21.16. Unless otherwise stated, future measurements will be expressed in English geographical miles. The reduction to statute miles can, however, be readily made by multiplying by 1.15. We add a comparison of some French and English measures for the sake of convenience in reduction :

| | | |
|---------------|------------|---------------|
| French foot = | 1.065.765 | English feet. |
| “ metre = | 39.370.091 | “ yards. |
| “ toise = | 6.394.592 | “ feet. |

Coming now to the subject of *Physical Geography*, we shall present a condensed description of the surface of the earth, introducing as many of such accessories to Physical Geography, as the distribution of plants and animals, aerial and oceanic currents, &c., as may be necessary for the proper elucidation of the plates.

The entire surface of the earth includes about 148,160,000 geographical square miles, of which about one fourth belongs to the land, and the remainder to the sea. The world of waters which thus covers the greater part of the earth, may be divided into five principal bodies or oceans : the Arctic, the Antarctic, the Atlantic, the Pacific, and the Indian.

The *Arctic Ocean* extends from the arctic circle towards the north pole : the *Antarctic*, from the antarctic circle to the south pole. The two are for the most part continually frozen, and consequently inaccessible.

The *Pacific Ocean* is bounded to the west by Asia and New Holland, to the east by the Americas ; to the south it is continuous with the Antarctic Ocean, communicating to the north with the Arctic Ocean, through Behring's Straits. Its area amounts to about 44,800,000 square miles, or nearly one third of the entire surface of the earth. The southern part of the Pacific Ocean is sometimes called the South Sea.

The *Atlantic Ocean* is bounded to the west by the Americas, to the east by Europe and Africa ; it is continuous to the north with the Arctic Ocean, to the south-west with the Pacific, and to the south-east with the Indian.

The *Indian Ocean* lies between the Atlantic and Pacific Oceans,

bordering to the north on Asia, to the east on New Holland, to the south on the Antarctic Ocean, and to the west on Africa.

The dry land belonging to the earth is divided into five parts or continents : Europe, Asia, Africa, the Americas, and New Holland. The largest of these is Asia, with about 14,128,000 square miles ; then comes North America with 5,472,000 ; South America with 5,136,000 ; Africa with 8,720,000 ; Europe with 2,688,000 ; and lastly, New Holland, or Australia, with 2,208,000 square miles.

1. EUROPE (*Plate 1*).

Europe extends from 36° to 71° north latitude, and from 9° west to $60^{\circ} 20'$ east longitude, reckoning from Greenwich. It is bounded on the north by the Arctic Ocean, on the South and west by the Atlantic, and to the east by Asia. Its eastern line of division from Asia has been variously assigned, although the Ural Mountains are now generally taken as the boundary. Its area amounts, as already remarked, to about 2,688,000 geographical square miles ; its coast line to 17,200 linear geographical miles.

The *Arctic Ocean*, or *Icy Sea*, presents one gulf, the White Sea. Of the many indentations of the Atlantic Ocean may be mentioned : *a*, In the west of Europe, the Scandinavian Sea, west of Norway, extending to the Arctic Ocean ; the English Channel between England and France ; St. George's Channel, or the Irish Sea, between England and Ireland ; the North Sea, united to the ocean to the south by the Straits of Dover ; the Skagerrack and the Cattegat, connecting the North Sea with the Baltic ; the Baltic or East Sea, with the Gulfs of Bothnia and Finland, with Riga Bay and the Bay of Biscay to the west of France and north of Spain. *b*, In the south of Europe we have the Mediterranean Sea connected with the Atlantic by the Straits of Gibraltar, and having numerous minor gulfs and seas. The principal of these are the Gulf of Lyons on the south of France ; the Tyrrhenian or Tuscan Sea, between Corsica, Sardinia, Sicily, and Italy ; the Adriatic Sea to the east of Italy ; the Ionian Sea between lower Italy and Greece ; the Egæan Sea, or the Archipelago, between Greece and Asia Minor ; the Sea of Marmora (Propontis), connected with the Egæan Sea through the Dardanelles (the Hellespont), and with the Black Sea through the Straits of Constantinople (the Bosphorus) ; finally the Black Sea with its gulf, the Sea of Azof.

The arrows placed in different parts of the seas represented on *pl. 1*, indicate the direction of the oceanic currents. Two kinds of currents may be distinguished : those produced by the action of the wind, and those entirely independent of this cause. The latter are the most important, constituting true streams of from fifty to two hundred miles in width. One of the principal of these is that which, striking from the north-western shores of Africa, crosses towards America, passing round in the Gulf of Mexico, and thence continued to the north as the Gulf-stream. On

reaching Newfoundland it is deflected eastwards, and passing south by the Azores, joins the equatorial current again, having made a circuit of 3800 miles, and embracing a vast space nearly stagnant in the centre, and known as the Sargasso Sea. An important branch current leaves the Gulf-stream near Newfoundland, and sets towards Britain and Norway. A current indicated on *pl.* 1 as "Rennel's Strömung," passes from the north-western corner of Spain, eastwards along the coast to Bayonne, then north along the coast of France, and across to the Irish coast at Cape Clear, then turning to the south-west; it thus describes an entire circle. A constant current passes from the Baltic through the Sound and the Cattegat into the North Sea; there is also a strong current from the Dardanelles into the Mediterranean. A double current passes by Gibraltar, an upper from the Atlantic into the Mediterranean, extending to the coast of Syria, and then turning back, and a second current towards the west, at a certain depth below the surface.

The largest *Mountains* of Europe are the Pyrenees, the Alps, and the Carpathians, to which may be added the Apennines, the Scandinavian Mountains, and others.

I. The *Pyrenees*. These separate France from Spain, and are about 270 statute miles long, by a maximum breadth of sixty miles. The highest point is the Malahite, or Maladetta, 11,170 feet; the middle comb is about 7990 feet in mean altitude. The central Pyrenees contain the loftiest peaks, the eastern and western (the latter especially) being of less elevation. Other important mountains of the Spanish peninsula are the Sierra Nevada, the water-shed between the waters of the Atlantic and of the Mediterranean; the Sierra Morena on the southern edge; the Guadarama; the Sierra de Toledo; the Sierra de Estrella in Portugal, &c.

II. The *Alps* in Switzerland, South France, and Germany, and northern Italy (the principal mountain chain in Europe), are divided up into numerous ranges, and may be considered under the following heads: the French-Italian Alps (with the Maritime, Cottian, and Grey Alps), the Bernese, Valois, and Central Swiss Alps (with the Pennine, Lepontine, and Rhetian Alps), and the Austrian Alps in its more extended sense including the Norian, Carnian, Julian, and Dinarian Alps. The highest peaks are Mont Blanc, 15,739 feet; Monte Rosa, 15,210; Mont Cervin, 14,836; Finsteraarhorn, 14,026; Jungfrau, 13,672; Mont Iseran, 13,272; Ortler Spitz, 12,851; Mont Terglou, 9386.

III. The *Carpathians* in Hungary, Galicia, and Siebenbürgen, divide into three principal members: the Highland of Siebenbürgen, the Carpathian Wald, and the Hungarian Carpathians. The highest peaks are Ruska Boyana, 9,912; Budosch, 9,593; Mount Tatra, 8,524.

IV. The *Apennines* in Middle and Lower Italy. Mount Etna in Sicily may be considered as the highest point (10,874 feet); on the mainland in the peninsula of Italy, the highest point is the Gran Sasso d'Italia, or Monte Corno, in the Abruzzi (9529 feet).

V. The *Hæmus* or *Balkan* in Turkey, with its southern spurs, Pangæus, Rhodope, the Strandsje, and the Tekiri.

VI. The *curve of mountains from the Cevennes to the Carpathians* in

Middle Europe, consisting of: *a*, the Cevennes in France, Mont d'Or (6200 feet) the highest point; *b*, the Jura, divided into the Swiss, the French, and the Suabian; *c*, the Middle Rhenish Mountains, divided into the Vosges or the Wasgau Mountains, with the Hardtgebirge and the Donnersberg on the left bank of the Rhine, the Schwarzwald (Feldberg 4675 feet high), the Odenwald, and the Spessart, on the right bank of the Rhine; *d*, the mountains in the north Germany and Belgium region, including the Ardennes, the Argonnerwald, the Eifel, the Hohewald and Hundsrück, the Siebengebirge, the Westerwald, Mount Taunus, the Rothhaargebirge, the Teutoburgerwald, and the Hartz; *e*, the Hessian Mountains (with the Rhoe, 3484 feet); the Meisner, the Vogelsgebirge, and the Habichtswald; *f*, the Bohemian Mountains, divided into the Fichtelgebirge, the Thuringerwald, the Frankenwald, the Erzgebirge, with the Mittelgebirge and the Saxonian Switzerland, the Lusatian Mountains, the Riesengebirge, the Sudetes, the mountains constituting the boundary between Bohemia and Moravia, and the Boehmerwald.

VII. The mountains of Great Britain attaining a height of 3557 feet in Snowdon (Wales), and 4380 in Ben Nevis (Scotland). The highest mountains in England are Cross Fell in Cumberland (3383), Helvyllen (3313), and Skiddaw (3083). The highest in Ireland is Curran Tual in the County Kerry (3412). Other prominent members of the mountain group of Great Britain, are the Cheviot Hills, the Pentland Hills, Lead Hills, the Peak Mountain, the Grampians, &c.

VIII. The *Scandinavian Mountains* extend from the southern point of Norway over a length of nearly one thousand miles to the North Cape. The highest points are the Skagestöltind, 8101 feet high, and Sneehättan 8120.

The principal of the numerous *Promontories* and *Capes* of Europe are: 1, the North Cape, the most northern point of Europe, and situated on an island; 2, Cape Lindesnäs, the southern point of Norway; 3, Arcona, the most northern point of Germany (on the Island of Rügen); 4, Skagen or Skagenshorn, the northern point of Jutland; 5, Duncansby Head, the northern point of Scotland; 6, Land's-End, the southern point of England; 7, Cape de la Roca in Portugal, the most western point in Europe; 8, Cape St. Vincent, the south-western point of Europe; 9, Tarifa, not far from Gibraltar, the most southern point of Europe; 10, Cape delle Armi and Cape Spartivento, the southern point of the Italian mainland; 11, Cape Santa Maria di Leuca and Cape d'Otranto, the south-eastern points of Italy; 12, Cape Peloro, Cape Passaro, and Cape Boco, the three points of Sicily; 13, Cape Linguetta and Actium on the west coast of Greece; 14, the promontories of Gallo, Matapan, and St. Angelo, on the south side of the Morea; 15, Colonna (the ancient Sunium) on the south-eastern side of Greece.

The most important *Valleys*, *Plains*, and *Lowlands* of Europe, are as follows: 1, the valley of the Po, included between the chains of the Alps; 2, the valleys of the Rhone and Danube, united by the lowlands of the Aar and the Rhine. Portions of these are: *a*, from the Lake of Geneva to the Lake of Constance; *b*, from the Lake of Constance to Linz (the former is

the Swiss lowlands, the latter the plain of Munich); *c*, from Linz to the Lake of Neusiedel; *d*, the valley of the Theiss or the great Hungarian plain, 1728 miles long in a direction from north to south, and 1152 from east to west, and in all probability the bed of a former lake. 3. The plains within the circle of mountains from the Cevennes to the Carpathians, including the plains of the middle Rhine and the Bohemian Elbkessel. 4. The great lowlands of eastern Europe, with their western off-shoots, the plains of the Baltic and North Sea. The whole of eastern Europe constitutes a single immense plain, extending from the Arctic Ocean and the Baltic to the Black and Caspian seas, and bounded to the east by the Ural Mountains. No point of this depression (as shown in Plate 1) is more than 180 toises or 1150 feet above the level of the sea; the highest known point is the Thurmberg, between Dantzic and Bütow. In Russia the plain rises not far from the town of Waldai, into the so called plateau of Waldai, to a height of about 1080 feet. This is important as the water-shed between the Black and Caspian seas and the Baltic.

The *Rivers* of Europe may be best examined according to the seas into which they empty.

I. Into the Arctic Ocean empty: Petschora, Mezen, Dwina (in Russia), and Tanaelf, the latter forming the boundary between Lapland and Norway.

II. Into the Cattegat empty: Glommen and Götaelf.

III. Into the Baltic there empty: Motalaelf, Lake Malar (with its outlets, Noreder and Süderstrom), Dalelf, Angermanelf, Piteaelf, Luleaelf, Torneaelf, in Sweden; Kymmene in Finland; Newa, Narowa (Narwa), Düna or Dwina in Russia; Niemen (Memel), Pregel, Passarge, Weichsel, Persante, Oder, Warnow, Trave, in Germany.

IV. Into the North Sea empty: Eider, Elbe, Weser, Ems, Hunte, Vechte, in Germany; Rhine, Maas, and Scheld, in the Netherlands. The most important branches of the Elbe are, on the right bank, Iser, Black Elster, Havel, Elde; on the left, Moldau, Eger, Mulde, Saale. The tributaries of the Weser, besides the Fulda and Werra by whose confluence it is formed, are: to the right, Aller with the Leine; to the left, Diemel and Hunte. Tributaries of the Rhine are: to the right Plessur, Ill, Treisam, Kinzig, Murg, Neckar, Main, Lahn, Sieg, Wipper, Ruhr, Lippe; to the left, Thur, Aar, Ill, Queich, Nahe, Moselle, Ahr, Erft. In the Netherlands the Rhine divides into the Waal, the Yssel, the Leek, the Vecht, and the old Rhine.

V. Of the rivers of Great Britain, there empty into the North Sea: the Thames, Ouse, Humber, Tweed, Forth, and Tay; the Clyde and Mersey into the Irish Channel; the Severn and the Shannon, the latter the principal river of Ireland, into the Atlantic.

VI. The Seine and the Somme empty into the English Channel.

VII. Rivers of France emptying into the Atlantic are: the Loire, Charente, Garonne, Adour, Bidassoa; those of Portugal are the Minho, Douro, and Tajo or Tagus; of Spain, the Guadiana and Guadalquivir.

VIII. There empty into the Mediterranean: 1, on the east coast of Spain,

Segura, Xucar Guadalaviar, Ebro, and Llobregat; 2, on the south coast of France, the Rhone and the Var; 3, on the west coast of Italy, the Arno, Ombrone, Tiber, Garigliano, Volturno, Sele; 4, into the Adriatic: Osanto, Metauro, Po, Etsch, Bacchiglione, Brenta, Piave, Tagliamento; on the east coast of Italy, Isonzo in Illyria, Kerka and Narenta in Dalmatia, Drin in Turkey; 5, into the Sea of Ionia: Acheron, Achelous, Alpheus, Eurotas, Inachus; 6, into the Egæan Sea: Cephissus, Asopus, Sperchius, Peneus, Haliakmon, Axios, Strymon, Nestus, and Hebrus.

IX. Into the Black Sea empty the Danube, with its numerous tributaries (to the right, Iller, Lech, Isar, Inn, Traun, Ens, Raab, Drau, Sau, Morawa; to the left, Wernitz, Altmühl, Naab, Regen, March, Gran, Theiss, Aluta, Sereth, Pruth), the Dniester and the Dnieper, and between these the Bug; the Don alone empties into the Sea of Azof.

The numerous inland *Lakes* of Europe most generally discharge their waters into the sea through rivers. The largest are the Lakes Ladoga, Onega, and Peipus, in Russia; Wener and Wetter in Sweden; the Platten and Neusiedler Lakes in Hungary. Lakes are most abundant in upper Italy and Switzerland (the Rhone flows through the Lake of Geneva, and the Rhine drains most of the other lakes).

The largest *Islands* of Europe are Great Britain, with about 69,000 square geographical miles, Ireland with about 32,000, and Iceland with about 28,000 square miles; all these lie in the Atlantic Ocean. In addition there are: 1, in the Arctic Ocean, various Norwegian Islands, among them the Loffodens; 2, in the Atlantic, the Faroes, the Shetland Islands, the Orkneys and the Hebrides to the north and west of Scotland; the Scilly Islands, the Isles of Man and of Anglesea; 3, in the English Channel the Isle of Wight, and the Norman islands, Jersey, Guernsey, and Alderney; 4, in the North Sea, the islands at the mouth of the Scheld along the coasts of Holland and Germany (Texel, Terschelling, Amelang, Norderney, Helgoland, &c.), also various Danish islands, Föhr, Sylt, &c.; 5, Laessoe and Anholt in the Cattegat; 6, in the Baltic, the Danish islands, Fünen, Seeland, Laaland, Möen, Langeland, Falster, Bornholm, Alsen, &c.; the German islands of Rügen, Usedom, and Wollin, the Swedish islands of Aland and Gottland; the Russian islands of Aland, as also of Oesel and Dagoe; 7, in the Mediterranean Sea: Ivica, Minorca and Majorca, Corsica, Sardinia, Elba, Capri, Ischia, Procida, Sicily, the Lipari and Ægadian Islands, Malta with Gozzo and Comino; 8, in the Adriatic Sea: Cherso, Veglio, and many islands belonging to Dalmatia; the islands of Tremiti on the east coast of Italy; 9, in the Ionian Sea, the Ionian Islands, Corfu, Zante, Cephalonia, Theaki, Santa Maura, Paxo, and Cerigo; 10, in the Egæan Sea, Candia, Egina, Hydra, Spezzia, Eubœa, the Cyclades, Lemnos (now Stalimene), &c.

The dotted lines (. . . .) on the Physical Chart of Europe (*pl.* 1), are isothermals; in other words, lines connecting places having the same mean temperature throughout the year. At the right hand side of the map the corresponding degrees of temperature are represented according to the scale of Reaumur, that of Celsius being employed to the left hand. The

conversion of Reaumur's scale into that of Fahrenheit, may readily be effected by multiplying $\frac{9}{4}$ and adding 32° . To make the conversion from the Centigrade or Celsius scale to Fahrenheit, multiply by $\frac{9}{5}$ and add 32° . Isothermal lines are those which connect places of the same mean summer temperature, and isocheimonal, similar lines expressing the same mean winter temperature. On some isothermal lines will be found marked the corresponding mean summer and winter temperatures. As a general rule, the cold increases both with the latitude and the elevation above the sea. At a certain elevation above the latter, the snow never melts, even in the hottest parts of the year. The boundary above which snow always exists, or the lower line of perpetual snow and ice, is called the *Snow line*. This possesses different elevations at different latitudes, sinking deeper and deeper with increase of latitude, until near the poles it comes down to the level of the sea.

The vegetation of a country depends greatly upon the mean annual temperature; still more upon the mean summer and winter temperature. The differences in respect to the vegetation of different sections of country, we have endeavored to express on our chart. The lines — — — — — indicate the northern or polar limits of various plants, as of trees (Bäume), grain (Getreide), fruit trees (Obstbäume), vine (Weinstock), and the olive (Oelbaum). In western France the culture of the vine extends only to $47^{\circ} 20'$ N. L., in Champagne to 50° , on the Rhine to 51° , at Grünberg in Silesia almost to 52° , &c. The extent over which a particular plant is met with, is called its circle of distribution; the extent from north to south is its zone of latitude, that from east to west the zone of longitude. From this is to be distinguished the vertical distribution of a plant, or its region, that is, the limits of maximum and minimum height above the level of the sea. Within the Arctic circle, the woody vegetation dwindles down to mere shrubs, no trees being present. Arable land, too, is present in only a few places. The most northern European cerealia are barley and oats; south of these we find rye, which in Norway and Sweden is met with up to 60° – 67° . The two first-mentioned grains constitute the principal articles of food in northern Sweden, Norway, and Scotland; rye, in southern Sweden, Norway, and Scotland, in Denmark, in the regions of the Baltic, and in the greater part of Germany; wheat in England, France, southern Germany and Hungary. In addition to wheat, rice and Indian corn are cultivated in Portugal, Spain, south France, Italy, and Greece.

In conclusion, the chart presents the height of numerous points above the level of the sea, expressed in French toises. The figures at various points of the ocean indicate the depth in fathoms of six feet. Remarkable inequalities in the bottom of the sea are indicated by shaded lines; an illustration may be seen on the map extending from the west coast of Sweden through the Atlantic Ocean, to the West of Great Britain, France, &c., where we observe such numbers as 250 and 70, 300 and 65, 140 and 70, close together, indicating a very sudden change in depth. (These general remarks, in explanation of the physical chart of Europe, apply equally to the physical charts of Asia, Africa, and America.)

2. ASIA (*Plate 4*).

The continent of Asia, the largest part of the world, embracing about 12,000,000 square geographical miles, and about 16,000,000 statute miles (according to other estimates, 14,128,000), lies entirely within the northern hemisphere. It is connected to Europe along a line of about 2000 miles, and to Africa by an isthmus of only 60. Behring's Straits separate it from America. Its greatest length, from Suez to Behring's Straits, is about 7370 miles; and its greatest breadth, from Cape Comorin in India to Cape Taimurski in Siberia, about 4320. It is included between 1° and 77° N. Lat., and 26° and 170° longitude east of Greenwich.

The *Seas* washing the shores of Asia are the Arctic Ocean in the North, forming the Gulfs of Obi and Kari; in the south, the Indian Ocean with numerous gulfs and bays, as the Persian Gulf, the Gulf of Cutch, the Gulf of Cambay, the Arabian Sea, the Gulf of Manaar, the Bay of Bengal, the Gulf of Siam, the Gulf of Tonquin, the Chinese Sea, the Gulf of Hoang-hai or the Yellow Sea, the Sea of Japan, the Sea of Okotsk, the Sea of Penjinsk, and the Sea of Behring or Kamtschatka.

The *Mountains* of Asia may be arranged in the following manner, although much still remains to be known respecting them.

I. The mountain chain of the desert of Cobi, in the middle of Asia, inclosing an area of over 1000 miles in length, and 200 to 400 miles in breadth, better known as Central Asia. The Bolor or Beloot Tagh Mountains form the western border, attaining a height of over 20,000 feet; the north-eastern border is constituted by the Thiam-shan or Celestial Mountains, and the Altäi chain dividing into the west and east Altäi, the latter connected with the Yablonsi Mountains; the eastern border is formed by the Kinghan, and the southern by the Kuenlun or Chinese range, to which also belong the Kulkun and the Tsunglin Mountains.

II. The Himalaya, south of the preceding, and connected to the north-west with the Tsunglin Mountains. The highest summits on the globe occur in these mountains, pre-eminent among which is Kunchinginga in Sikim, 28,118 feet high. Dwalagiri in Nepaul, until lately considered as the point of maximum elevation, is 26,862 feet high. Juwahir in Kumaoon is 25,670, &c. In fact there are twenty-two peaks of the Himalaya, each known to exceed 20,00 feet in height. The highest pass of this range is the Karokorun Pass in Tiet, 18,600 feet. The mean height of the Himalaya has been variously estimated from 11,000 to 16,000 feet.

III. The Ural Mountains form the natural boundary between Europe and Asia. They extend from Ustart as the southern limit between the Casian Sea and the Lake of Aral, to the Gulf of Karskair (or Karia) in the Blar Sea. They attain a height of 5397 feet in the Kondjakowskoi-Kanen Peak.

IV. The mountains of Hindostan, namely the Ghauts and the Vinäya. The former divide into the West Ghauts, which extend for a length of 800 miles along the western coast, and attaining a height of 8760 feet in the

Neilgherries; and the much less elevated East Ghauts, separated from the other branch by the Deccan.

V. The mountains encircling the table land of Persia or the plateau of Iran, of a height of from 4000 to 7000 feet above the sea. This is bounded to the north by the Hindukhos, which is the western continuation of the Himalaya, attaining a height of over 20,000 feet, and connected through the Parapomisan chain with the mountains of Elbruz on the southern extremity of the Caspian Sea (Damavend, the loftiest peak of the Elbruz, 15,000 feet high). To the east of the table land of Persia is found the Indo-Persian mountain boundary, with a peak, Sufeid Kho, 15,000 feet high; also the Soliman chain and the Brahu Mountains. In the south-west is a range of 120 to 200 miles broad, connected with the Elbruz, and parallel with the south-western shore of Iran; this attains a height of 13,000 feet in Mount Sevellan, east of Tauris.

VI. The mountains of Armenia and Koordistan, forming the water-shed between the Persian Gulf, the Black, and the Caspian seas. The highest mountain in Armenia is the time-honored Ararat, 17,112 feet high. Branches of the Armenian mountains are: 1. The Caucasus, between the Caspian and Black seas, 120 to 200 miles long, and attaining a height of 18,493 feet in Elbruz. 2. The Antitaurus (highest point Argæus, 13,197). 3. The Taurus, in Asia Minor, connected with the preceding. Single mountains of Asia Minor are Olympus, Ida, Tmolus, &c.

VII. The mountains of Lebanon in Syria, divided by the valley of Cælo-Syria into Lebanon proper and Anti-Lebanon, are connected towards the south with the mountains east and west of the Jordan; among these are Tabor, Carmel, Gilead, &c. The elevation of Lebanon proper is 9517 feet.

VIII. Sinai and Horeb on a small peninsula in the north-west of Arabia, the former 7498 feet, the latter 8593 in height.

The most important *Capes* and *Promontories* of Asia are: 1. Ras-el-Gad, the south-eastern point of Arabia. 2. Ras Muhammed, the southern point of the peninsula of Sinai. 3. Cape Comorin, the southern point of Hindostan. 4. Cape Romania, the southern point of the Malayan Peninsula, and the extreme southern point of the mainland of Asia. 5. Cape Cambodja, the southern point of the eastern part of Further India. 6. Cape Lopatka, the southern point of Kamtschatka. 7. The East Cape or the Promontory of Tschuktschen, the most eastern point of Asia. 9. Cape Taimura or Siwero Wastotschnoi, the most northern point of Asia.

The most extensive *Plains* and *Deserts* of Asia are: 1. The Desert of Cobi, having in its centre a sandy tract of from 80 to 200 miles in breadth, and 2500 feet high, called Schamo, or Hanhai, bordered to the north and south by two rocky and elevated plains of about 3600 feet in height. 2. The great Indian Desert of Scind, in Eastern India, 440 miles long, and 320 broad. 3. The plateau of Iran. 4. The great Desert of Tartary. 5. The Syro-Arabian Desert. The entire area of all these deserts is probably fully equal to that of the whole of Europe.

The *Rivers* of Asia emptying directly into the sea are:

I. Those of the Indian Ocean. Into the Persian Gulf empty the Euphrates and the Tigris, which, by their union, constitute the Ghat-el-Arab, or the Arabian River; along the west coast of Hindostan empty the Indus, Nerbudda, and Tapti; along the east coast of Hindostan empty the Kaweri, Krishna, Godavery, and Mahanudy; into the Bay of Bengal empties the Ganges, to which is united the Brahmaputra, shortly before; the Irawaddy, the Thaluen, and the Tanasserim, discharge their waters along the western shores of Further India.

II. Into the Pacific Ocean there empty, along the eastern coast of Further India, the Menam and Cambodja; in China the Yantsekiang, or Blue River, and the Hoangho, or Yellow River; in Mandschurei, the Amur, arising from the confluence of the Argun and the Schilka; in Eastern Siberia the Anadyr.

III. Into the North Polar Sea, or Arctic Ocean, empty the Kolyma, Indigirka, Jana, Lena, Jenisei, and Ob.

IV. Into the Black Sea empty the Kuban, Phasis (now called Rion), Halys (Kisil-Irmak), Sangaris (Sakarja).

V. Into the Sea of Marmora, the Granicus, important only in an historical point of view.

VI. Into the Mediterranean empty, on the west coast of Asia Minor, the Scamander, Hermus, Caystrus, and the Meander; on the south coast of Asia Minor, the Cydnus; and the Orontes, the Leontes, the Belus, and the Kison, on the coast of Syria and Palestine.

Numerous rivers empty into the inland seas, of which latter, the Caspian, 640 miles long, and from 100 to 240 broad, is by far the largest. Along its northern shore empty the Ural and the Wolga; along the western coast the Kuma, Terek, and Kur. Besides this there are discharged into the Aral Sea the Gihon (Oxus) and the Sihon (Jaxartes); into the Dead Sea the Jordan, Kedron, and Arnon. Other lakes are Baikal, Balkasch, Urmia, Wan, Zareh, Lop, &c.

Asia possesses numerous *Islands*, the principal of which are distributed as follows. 1. In the Indian Ocean: the Laccadives, the Maldives, the Andamans, the Nicobar Islands, and the great island of Ceylon, of about 16,000 square miles, and containing a mountain, Adam's Mountain, 7420 feet high. 2. Between the Indian and Pacific Oceans: the great Isles of Sunda, namely, Borneo, Sumatra, Celebes, and Java, together with the lesser Isles of Sunda, and the Moluccas or Spice Islands. 3. In the Pacific Ocean: the Philippines, of which Manilla or Luzon, and Mindanao, are the largest; the Chinese islands, among them Hainan and Formosa; the Japanese Islands, the largest of them Nipon and Jesso. The Kurile and the Aleutian Islands between Asia and America. 4. In the Arctic Ocean: Novaja Semlja, Spitzbergen, and New Siberia. 5. In the Mediterranean, not far from the coast of Asia Minor, lie Cyprus, Rhodes, Chios, Samos, Lesbos, Tenedos, &c.

The *Isothermal Lines* of Asia are given on her physical chart (*pl.* 4). One of these is marked — — — —, and is indicated as the equator of heat (Wärmeäquator); by this is to be understood that isothermal

which corresponds to the greatest observed mean temperature of about 82° F. It will be seen that this is far from coinciding with the terrestrial equator. The chart also expresses the equatorial limit of perpetual snow, and of the falling of snow; these show how far to the south perpetual snow lies in different countries, and how far it falls during winter. The former line coincides with the polar limits of mosses and berries.

The chart likewise indicates the limits of different kinds of plants, among which, in addition to the various cerealia, are to be found the sugar-cane (Zucker), coffee (Kaffee), tea (Thee), cotton (Baumwolle), rice, &c.; also, the polar limits of trees, the equatorial and polar limits of the vine, and of the European tropical cerealia.

3. AFRICA (*Plate 5*).

This still, for the most part, unknown portion of the earth, extends from $37^{\circ} 20'$ north latitude to $34^{\circ} 50'$ south latitude; its limits in longitude are $51^{\circ} 22'$ east, and $17^{\circ} 32'$ west longitude, reckoned from Greenwich. Its greatest length is 5000 statute miles; its greatest breadth about 4800. It contains about 8,902,000 square geographical, or nearly 12,000,000 statute miles. It is bounded on the north by the Mediterranean Sea, on the west by the Atlantic, on the south and east by the Indian Ocean; to the north-east it is connected to Asia by the Isthmus of Suez, and is separated from Europe to the north-west by the Straits of Gibraltar.

The portion of the Atlantic Ocean washing the south-western part of Africa, is the South Atlantic, the northern part of which is termed the Gulf of Guinea. Smaller portions of the Gulf of Guinea are the Bights of Benin and Biafra. The small portion of the Indian Ocean which separates the Island of Madagascar from the mainland of Africa, is called the Mozambique Channel. Between the north-eastern coast of Africa and the western coast of Arabia, the Indian Ocean runs up in a long, narrow gulf, the Arabian gulf, or the Red Sea; this is connected with the main ocean by the Straits of Bab-el-Mandeb. The northern extremity of the Red Sea is called the Gulf of Suez. In the northern part of Africa the Mediterranean forms the Gulfs of Sidra, Cabes, and Tunis.

Among the *Currents* of the African seas, as represented on our physical chart of the Continent (*pl. 5*), the following are the most important: Two currents from the Indian Ocean (one of them much the stronger of the two, coming through the Mozambique Channel) unite not far from the southern point of Africa, and there constitute a current from 360 to 400 miles broad (the Cape current), which soon after takes a north-westerly direction, with a mean velocity of about twelve miles per hour. From this branches off the South Atlantic current, which passes along the western coast of South Africa, and subsequently, when the coast takes a direction to the west, continues westward along the equator. It now forms the main Equatorial current, but between it and the coast there runs another current from north to south, nearly in the opposite direction, and known as the Guinea current.

The Equatorial current continues its course on both sides of the equator, and at a degree of latitude corresponding to about 20° west of Greenwich, separates into a northern and west-south-western branch, of which the latter again bifurcates. The Guinea current already mentioned is only part of the great North African current which passes southwards along the western end of the Desert of Sahara. The South Atlantic connecting current carries the waters of the Atlantic and Pacific Oceans into the Indian Ocean; little, however, is known of its extent and direction.

Very little is known of the *Mountains* of Africa. The following are the principal, as far as ascertained:

I. The Atlas, in the western part of North Africa. The most western part is the High Atlas, which, in Morocco, attains an elevation of 15,000 feet, and is covered with perpetual snow; the eastern and northern part along the Mediterranean is called the Lesser Atlas, the most southern part the Great Atlas. Eastern continuations are the Ghariano and Soudah Mountains. East of the great Gulf of Sidra, the Plateau of Barca elevates itself to a height of some 1600 feet. The left bank of the Nile is occupied by the Libyan chain.

II. In Middle Africa we find the Abyssinian Alps, not far from the Red Sea, and sometimes called the Samen Mountains; to the south these are connected with the Mountains of the Moon (Dschebel el Kamar), and the Barakat Mountains.

III. In South Africa the mountains of the Cape are conspicuous for their elevation, and consist of three parallel ranges. The first, Lange Kloof, runs parallel to the coast; the second is the Zwart Berg; and the third is the Nieuweveldt's Gebirge, the highest of all (over 10,000 feet).

The principal *Capes* are: 1. On the north coast: Capes Spartel, Bugarona, Farina, Bon, Rasat. 2. On the west coast: Capes Cantin, Ger, Nun, Bojadore, Lagnedo, Blanco, Mirik, Verde (westernmost point of Africa), Roxo, Verga, Sierra Leone, Mesurado, Palmas, Three Points, Coast Castle, St. Paul, Formosa, St. John, Lopez, Gonsalvo, Padron. 3. On the southern coast: Cape of Good Hope, Aiguilles, Infanta, St. Francisus, Recife, Morgan. 4. On the east coast: Corrientes, Delgado, Guardafui (the easternmost point of Africa).

Among the innumerable plains of Africa, by far the most extensive even in the world, is the Great Desert of Sahara, 2500 miles long, and 800 broad, containing 2,000,000 square miles of area. The fertile spots, like islands, which are distributed through the Desert, are called Oases; the largest of these is the Oasis of Fezzan. The eastern part of Sahara is called the Libyan Desert, separated from the Nubian Desert by the river Nile; the western portion, which is the true Sahara, contains but few oases.

The *Rivers* of Africa are:

I. Those emptying into the Mediterranean. The most important of these is the Nile, formed by the junction of the Blue River (Bahr el Azrek) and the White River (Bahr el Abiad). It is 2700 statute miles long, and empties into the sea by two arms (formerly by seven) forming the Delta of the Nile. From August to October of each year, it rises from twenty

to twenty-five feet, and fertilizes the adjoining country by its overflow.

II. Rivers emptying into the Atlantic. These are the Senegal, the Gambia, the Rio Grande, the Niger (emptying by numerous arms into the Bight of Benin, and there constituting an immense Delta), the Congo or Zaire, the Cuenza or Coango, and Orange River or the Gariep.

III. Into the Indian Ocean there empty only inconsiderable rivers, the only ones deserving mention being the Lorenzo-Marquez, the Zambeze, and the Quilmance.

Africa possesses but few inland *Lakes*. The largest, as far as known, is Lake Tschad, situated in the interior, at an elevation of about 1400 feet, and into which flow various rivers, as Yeou, Shary, &c. In the north-east of Africa we find Lake Zana in Abyssinia, through which the Nile flows; south-east of this is the Zawaja; also Lake Mœris (Berket el Kerun) and the Natron lakes in Egypt; and the Moravi or Zembre lake in the south-east. The elevated Lake Kouffa is situated to the north-west of the latter.

Islands. 1. To the east of Africa: Socotra, in the south of Arabia; the Seychelles or Mahé Islands, south of the equator, with the Almirante Islands, together forming the Ethiopian Archipelago; Madagascar, the largest of all the islands of Africa, containing about 160,000 square miles, and separated from the mainland by the Channel of Mozambique; the islands of Comoro and Primeira, in the Channel of Mozambique; and the Mascarene Islands to the east of Madagascar, among which are included the Mauritius (Isle of France) and Bourbon. Upon the latter is a mountain of more than 10,000 feet in height.

2. In the west of Africa. *a*. North of the equator: the Azores or Terceiras (among them St. Michael, Terceira, Flores, Pico, &c.), Madeira, the Canary Islands, Ferro, Palma, Teneriffe, with its peak of 12,172 feet in height; the Cape de Verde Islands, the largest of which is St. Jago, with the volcano of Fuego, 9154 feet high; the Guinea Islands, of which Fernando Po, Prince's Island, and St. Thomas lie north, and Anabon south of the equator. *b*. South of the equator: Ascension, St. Helena, and Tristan d'Acunha.

The *Isothermals* of Africa are shown on the chart. The equator of heat, or the isothermal of 82° F., passes through the middle of Africa, and the equatorial limit of snow through the northern part of Africa, Algiers, Tunis, and Morocco. The southern limit of the vine passes a little further south, through Egypt, &c.; through South Africa passes the south polar limit of the banana, and of the tropical grains; also the equatorial limit of the European tropical grains; still further south is the polar limit of the palm.

4. AMERICA (*Plates 6 and 7*).

The continent of America is divided into two portions, called North and South, by a narrow strip of land, the Isthmus of Panama. North America

lies between 8° and 72° of north latitude, and 55° and 188° of longitude west of Greenwich. Its greatest length from Cape Lisburn in Russian America, to Cape Sable in Florida, is about 4260 miles; but a somewhat winding line, extending from the Isthmus of Panama to the Arctic Ocean, west of Mackenzie River, will not fall far short of 5900 miles. Its greatest breadth between 62° and 74° is nearly 3000 miles. It contains about 7,400,000 square statute miles.

South America extends from 12° N. latitude to 56° S. latitude. Its greatest length amounts to 4550 miles, the greatest breadth to 3200: the area included is 6,300,000 square statute miles, being thus over 1,000,000 of square miles less than North America. For the sake of conciseness we shall consider the entire Continent as a whole.

The northern part of the Continent is bounded by the Arctic Ocean, and the vast space between it and the Atlantic is occupied by Baffin's Bay, with its strait (Davis's), and Hudson's Bay, with James Bay in its southern part, and communicating with the Atlantic by Hudson's Strait.

The principal indentations of the Atlantic Ocean are the Gulf of St. Lawrence, Bay of Fundy, Massachusetts Bay, Narragansett Bay, Delaware Bay, Chesapeake Bay, the Gulf of Mexico, and the Caribbean Sea, with their various bays, Campeachy, Honduras, Darien, Maracaibo, &c.

On the Pacific side we find Behring's Sea, or the Sea of Kamtschatka, between America and Asia, connected with the Arctic Ocean by Behring's Straits; Bay of San Francisco; Gulf of California; Bay of Panama; Gulf of Guayaquil; and the Straits of Magellan, separating the mainland of South America from Terra del Fuego.

We have already referred to the principal current of the Atlantic Ocean, as coming from Africa, and dividing in the vicinity of Cape St. Roque, one branch going north towards the West Indies, another south along the coast of Brazil. The former passes through the channels of the lesser Antilles into the Caribbean Sea. A most remarkable current, known as the Gulf Stream, passes out from the Gulf of Mexico towards the north-east, and is conspicuous on account of the high temperature of its waters. Among the currents of the Pacific we may mention the cold Peruvian current, passing along the west coast of South America, from south to north. South of Cape Horn a constant current passes from west to east, from the Pacific to the Atlantic Ocean. The currents of the North Pacific have not yet been satisfactorily ascertained, although a constant stream is known to flow south, along the coast of California.

I. The loftiest *Mountains* on the continent occur in South America. Here, for example, we find the Cordilleras, which traverse the whole of South America from north to south. The highest peak is Aconcagua in Chili (23,910 feet). Chimborazo, long considered the highest mountain of America, is exceeded by several other peaks; it is about 21,424 feet high. Cayambe, near the equator, has an elevation of 19,535 feet; Antisana, 19,137; Cotopaxi, 18,875; Pinchincha, 15,924; Tunguragua, 16,424.

II. The Brazilian Mountains, which run parallel with the coast, and bear different names, as Sierra do Mar, Sierra Mantequeira, Sierra Espinhaço,

&c. They extend along a distance of about 2000 miles, scarcely ever attaining a height of over 6000 feet.

III. The Oronoco Mountains, in the north-eastern part of South America.

IV. The Rocky Mountain range of Mexico and North America. With this is associated a lofty table-land, beginning at the Isthmus of Tehuantepec, and extending north-west to the parallel of 42° . It is of greatest breadth (360 miles) and height in the latitude of the city of Mexico, at which place it is 7430 feet above the level of the sea. In the vicinity of the city of Mexico are situated numerous volcanoes, pre-eminent among which are Popocatepetl, 17,884 feet; Orizaba 17,374; and Iztascihuatl, 15,705 feet above the level of the sea. The mountain system of North America proper is one of no little complexity. The Rocky Mountains, as the central range, extend to the mouth of Mackenzie River; a second great range extends from the Peninsula of California to Russian America, leaving only two gaps for the passage of the waters along the west side of the Rocky Mountains, which are occupied respectively by the Columbia and Frazer's rivers. It possesses several peaks more lofty than those of the Rocky Mountains, among which are some active volcanoes. This range in California is known as the Sierra Nevada. Immediately along the coast of California is a range of mountains, known as the Coast Mountains, and separated from the preceding by the valleys of the Sacramento and San Joaquin. It is pierced by the Bay of San Francisco. About the latitude of 42° a chain of mountains extends east and west, between the Sierra Nevada and the Rocky Mountains, forming the northern boundary of the Great Western Basin of North America. This basin is about 500 miles in diameter each way, and contains its own system of lakes and streams, without any connexion with the sea. Many of these lakes are salt; the most remarkable are the Great Salt Lake (Timpanagos of Humboldt) and Utah. The Ozark Mountains, which run from Texas to the Mississippi, may be considered as an offset from the Rocky Mountains. The highest summits in the mountains of Western North America are Mount St. Elias, 16,775 feet; Fremont's Peak, 13,570; Mount Brown, 16,000; Mount Hooker, 15,700 feet; Long's Peak, 13,470; James's Peak, 11,500, &c. Some of these estimates are doubtless incorrect.

V. The Alleghany Mountains, which occupy the region east of the Mississippi River, have for their base a strip of table-land, extending from Alabama to the mouth of the St. Lawrence. This high land is traversed throughout 1000 miles, from Alabama to Vermont, by from three to five parallel ridges of low mountains, rarely more than from 3000 to 4000 feet high, and separated by fertile longitudinal valleys. The Alleghanies proper are, however, restricted to Pennsylvania and Virginia. The chain is well characterized by the parallelism of the ridges, and the uniform level outline of their summits, with but few indentations. To the south they maintain a distance of 200 miles from the Atlantic; further north, however, they approach closer to the coast, as in the south-eastern part of New York, whence their course is nearly north towards the St. Lawrence. The most

eastern ridge is continued in the double range of the Green Mountains to Gaspé Point in the Gulf of St. Lawrence. Branches extended as high as Baffin's Bay. The highest point in the chain is Black Mountain, 6476 feet. Next to this are Mount Tahawus, or Marcy, 5344 feet; and Mount Washington, 6225.

Capes. 1. In South America: Point Salinas, to the north; Cape Roque, or Point Toira, in Brazil, the most eastern point; Cape Forward, the most southern point of the main land; Cape Horn, the southernmost point of America, on the island l'Hermite; Cape Blanco in Peru. 2. North America: *a*, on the Pacific; Cape Corrientes in Mexico, Cape St. Lucas, the southern point of Lower California; Cape Mendocino, Cape Gregory, Cape Lookout, Cape Flattery, Cape Newenham, and Cape Prince of Wales. *b*. In the Arctic Ocean: Cape Barrow, Cape Dalhousie, Cape Bathurst, Cape Parry; Point Turinagain, Cape Franklin; Cape Liverpool, Cape York. *c*. In the Atlantic Ocean: Cape Farewell, the southern point of Greenland; Cape Charles in Labrador; Cape Baze in Newfoundland; Cape May, Cape Henlopen, Cape Hatteras, Cape Lookout, Cape Fear; Cape Sable, the southern point of Florida; Cape Catoche, the northern point of Yucatan.

Among the *Plains* of America may be mentioned the immense Pampas of Brazil, especially those on the western bank of the La Plata, extending from 20° to 40° south latitude, and abounding in salt and saltpetre; 2, the wooded plains (*Selvas*) of the Amazon, from 4° north latitude to 15° south latitude; 3, the grass-covered Llanos of the Orinoco; 4, the Prairies of the Mississippi, nearly as large as the whole of Europe, and partly covered with high grasses; 5, the plains of Canada.

Rivers. I. Those of South America emptying into the Atlantic Ocean: 1, the La Plata, arising by the confluence of the Paraguay, the Parana, and the Uruguay, 1920 miles long; 2, St. Francisco in Brazil, 1400 miles; 3, the Amazon, or Maranhon, in Brazil, 3080 miles long, traversing the whole breadth of South America, and receiving in its course above sixty considerable rivers; it is from 4000 feet to twelve miles wide (forty-eight at the mouth of its long arm, and twenty at that of the south); 4, the Orinoco, 1200 miles long, emptying into the ocean by forty arms; 5, the Magdalena in New Grenada, 800 miles long.

II. In North America. A. Emptying into the Atlantic Ocean: 1, the Rio del Norte, or Rio Grande; 2, the Mississippi, 2896 miles long from the Gulf of Mexico to its source above Itasca Lake, and 3610 miles from the mouth to the head of the Missouri, thus forming the longest river in the world; 3, the Alabama; 4, the Apalachicola; 5, the Suwanne, all emptying into the Gulf of Mexico; 6, the St. John's; 7, the Altamaha; 8, the Savannah; 9, the Cape Fear; 10, the Roanoke; 11, the James; 12, the Potomac; 13, the Susquehanna; 14, the Delaware; 15, the Hudson; 16, the Connecticut; 17, the Kennebec; 18, the Penobscot; 19, the St. Lawrence. Numerous rivers of considerable size empty into Hudson's Bay, as Nelson, Churchill, &c.

B. Into the Arctic Ocean there empty Back's, or Great Fish River, the Coppermine, and the Mackenzie.

C. Into the Pacific there empty the Columbia or Oregon, the Sacramento and Joaquin, the Colorado and the Gila, and some smaller streams.

Lakes. 1. South America has but few lakes, and those of small extent; the largest are Titicaca in Peru, area 1000 square miles, and Lake Maracaibo (area 1200 square miles) connected with the Gulf of Venezuela.

2. In Central America, Lake Nicaragua.

3. In North America: Lake Superior, 35,000 square miles; Lake Huron, 20,000; Michigan, 25,000; Erie, 10,000; Ontario, 8,200. All of these are connected in one continuous series, discharging their waters through the St. Lawrence River. Lake Champlain, 900 square miles, is an offset of the same system; Lake Winnipeg, 12,500, drained by Nelson's River; Great Slave Lake, 13,500; Athabasca, 3500; and Great Bear Lake, 9000 square miles; all these empty into the Arctic Ocean by Mackenzie River. The Great Western Basin contains two remarkable lakes, one (the Great Salt Lake) about seventy miles long, with its waters saturated with salt; the other, and connected with the latter, Utah Lake, containing fresh water. It is between these two lakes that the Mormons have established the nucleus of their new State of Deseret.

Islands. A. In the Atlantic: *a, North America.* Southampton in Hudson's Bay; Anticosti, Prince Edward's, and Cape Breton, in the Gulf of St. Lawrence; Newfoundland, Long Island, and the Bermudas. *b, West Indies.* The Bahamas, among which is San Salvador or Guanahani, discovered by Columbus in 1492; the four greater Antilles, viz. Cuba, 43,380 square miles; Hayti or St. Domingo, 29,400; Jamaica, 5,520; and Porto Rico, 3865; the lesser Antilles, which constitute an arc, extending from Porto Rico to Trinidad. The largest are Trinidad, Guadaloupe, Martinique, Barbadoes, Tobago, Dominica; Margarita, Curacao, and others, lie on the north coast of South America. *c, South America.* Fernando de Noronha and Trinidad on the coast of Brazil: the Falkland Islands; Terra del Fuego, Staten Land, l'Hermite, and others to the south of South America; New or South Georgia, Sandwich Land, South Shetland, and the South Orkneys.

B. In the Pacific Ocean: *a, North America.* Kodiak, Sitka, Washington or Charlotte, Vancouver, Prince of Wales, &c. *b, South America.* The Gallapagos, San Felix, Ambrosia, Juan Fernandez, De la Campana, Madre de Dios, the Chiloe Islands.

C. In the Arctic Ocean: Melville Islands, Discoe, &c.

D. In the Antarctic Ocean: there are obscure indications of islands in the Antarctic Ocean, some of which are probably portions of an Antarctic continent.

For the explanation of isothermal lines, and of the lines marking the boundaries of various plants, as marked on the physical charts of North and South America, we would refer our readers to the article on Europe.

5. AUSTRALIA (*Plate 32*).

Australia, sometimes called Australasia, is the name given to an

assemblage of huge insular masses of land, occupying the western parts of the Pacific, and extending southwards from Eastern Asia.* These great oceanic tracts consist of: 1, New Holland, often called Australia; 2, Van Diemen's Land; 3, New Zealand; 4, Papua; 5, New Britain, New Ireland; 6, Solomon's Island; 7, New Hebrides; 8, New Caledonia; 9, Polynesia. Of these New Holland is by far the most extensive, embracing an area of nearly 3,000,000 square miles, with a length of 2600 miles from east to west, and 2000 from north to south. It is included between $10^{\circ} 30'$ and 39° south latitude, and between $112^{\circ} 20'$ and $153^{\circ} 40'$ longitude, east of Greenwich. It is watered partly by the Indian, partly by the Pacific Ocean. The former indents the north shore in the Gulf of Carpentaria, and separates the Continent from Papua or New Guinea, in Torres Straits. Bass Strait separates it to the south from Van Diemen's Land.

Little is known of the *Mountains* of New Holland, excepting that they constitute a rocky wall running nearly round the whole island. Their highest summits do not appear to exceed 3000 feet. Mount Kosciusko is said to be the loftiest, next to which come Mounts Bellenden, Elliot, Abbon, Mitchell, Cockburn, Rugged, Sterling, and Round Mountains.

The principal *Capes* are Wilson's promontory, the extreme south point, Cape Leeuwin (south-western point), Cape Escarpee (western point), Cape Grenville (northern), and Sandy Cape (most eastern point).

The principal *Rivers* on the eastern coast are the Brisbane, the Hastings, and the Hawksbury; on the south coast, the Murray, with its tributaries, the Morumbidgee and Darling; on the western coast, Swan River.

Van Diemen's Land lies to the south of New Holland, of which it may be considered an island. It contains an area of 27,192 square miles. New Zealand comes next in point of importance, ranging parallel to the south of New Holland, with a broad intervening expanse of ocean; area 62,160 statute square miles. Papua is the largest mass next to New Holland, being from 1200 to 1400 statute miles in length, and varying from 150 to 200 miles in breadth. It possesses various mountains of great elevation. New Britain and New Ireland are the largest of a group of islands beginning at the north-eastern boundary of New Guinea, and ranging in a circuitous line parallel to New Holland. The area has been estimated at 16,000 statute square miles. Solomon's Islands form an archipelago lying east of New Guinea. The New Hebrides are situated to the south-east of the preceding. New Caledonia is a large island 250 miles long and sixty broad, forming the southern termination of the great chain of archipelagoes to the east of New Guinea and New Holland.

The islands constituting the extended group called Polynesia, although in all strictness excluded from Australia, may yet be considered in this place for the sake of convenience. First among them are the Society Islands, including Tahiti, Eimeo, Ulietea, Huahine, &c. The Paumotu group is a series of very low coral islands, extending E.S.E. from the Society Islands. Pitcairn's Island, Easter Island, and Cook's Island, are of small size. The Sandwich Islands constitute a solitary group far north of the main range. They are ten in number, of which eight are habitable.

Of nearly 7000 square miles contained in the whole, Hawaii alone embraces 4,500. The others are Maui, Oahu, Tauai, Molakai, Ranai, Niihaw, Taharowa. We have only room to mention the names of the remaining clusters: they are the Mendana Archipelago, including the Marquesas and the Washington Islands; the Friendly Islands, or the Tonga Archipelago: the Feejee Islands, Navigators' Islands, the Carolines, the Central Archipelago, the Pelew Islands, and the Ladrões or the Marianne Islands.

B. HISTORICAL GEOGRAPHY.

GEOGRAPHY OF ANCIENT TIMES (*Plates 8, 9, 10*).

The first geographical accounts, or rather indications, are due to the oldest Greek poets, of whom Homer in particular presents us with numerous geographical and ethnographical accounts, for which reason he may be looked upon as the oldest geographer. He supposed the earth to be a circular disk, inclosed by a great body of water, the ocean. In its midst lay the mainland of Hellas. Above the earth was placed the brazen vault of the heavens, and beneath the earth a similar vault, inclosing Tartarus, or the lower regions, situated as far below the earth as this was below the heavens. Of all the regions of the earth, Homer was only acquainted to any extent with Greece and Asia Minor, although he refers to Thrace, Phœnicia, Egypt, Lybia, Ethiopia, and some few islands in Western Europe. Hesiod (800 B. C.) had more knowledge of this subject than Homer; in his writings we find the first mention of Modern Italy, as also of Spain, under the name of the Garden of the Hesperides. Æschylus and Pindar distinguished three parts of the world, bounded by the Phasis and the Nile. The philosophers of the Ionian school (founded by Thales of Miletus, 640–548 B. C.) endeavored to attain a knowledge of the shape and physical features of the earth by deductions from hypotheses; it was the school of Pythagoras, however, that first broached the idea of the sphericity of the earth. The so-called logographers, or the oldest Greek historians before Herodotus, extended the knowledge of geography to a considerable extent. Among them may be especially mentioned Hecataeus of Miletus (549–486 B. C.). Certain projectors and historians of (at that time) great voyages of discovery, as Scylax (509 B. C.) and Hanno of Carthage (500 B. C.), also deserve honorable mention. (For the idea of Geography, as possessed by the ancients, see *pl. 8*.)

Herodotus of Halicarnassus (484–408 B. C.) is, however, to be looked upon as the true father of ancient geography, having travelled extensively for years at a time, and published the results in historical works, many of which are still extant. He returned to the first idea of a terrestrial disk resting in the centre of the universe, and assigned to the disk an elongated or oval outline, and an encompassing ocean. A division into two great halves appeared to him more appropriate than that into three parts; these

were separated by the Mediterranean, the Black, and the Caspian seas; the northern division included Europe with Northern Asia to the Phasis; the southern, the rest of Asia and that portion of it forming the peninsula of Libya (*i. e.* Africa). In his works we first find the name Italia. The last inhabited land of Europe, according to him, is Thrace. Scythia forms a square, each side of which amounts to 4000 stadia; to the north, next to Scythia, dwell the Agathyrsi, Androphagi, &c., and the Sauromatæ, north of the sea of Azof (Mæotis). Asia, separated from Europe by the Phasis, and divided by the Halys into two principal portions, is as large as Africa. Along the Mediterranean, inhabited by the Colchians, Saspeirians, Medes, and Persians, are two great peninsulas, the one containing Asia Minor, the other Persia, Syria, and Arabia. The latter is the most south-western land in Asia; India the most south-eastern land in the world. Africa, or Libya, was divided by Herodotus into three portions: the Valley of the Nile or Egypt, Libya in its restricted sense, and the land of Ethiopia, or the most south-western inhabited region. (See the map of the world according to Herodotus, on *pl.* 8.)

After Herodotus, the following are the Greek authors who added to the science of Geography: Ctesias of Cnidos, whose works are lost; Thucydides, in his history of the Peloponnesian war; Xenophon, in the *Anabasis* and other works; Theopompus; Scylax, in his *Periplus*; Pytheas; Aristotle, who asserted the sphericity of the earth from observations on lunar eclipses, and on the general principles of Gravity; Theophrastus, &c.

Geography was first placed on a systematic basis by Eratosthenes of Cyrene (276–194 B. C.); he it was who wrote the first scientifically arranged work on the subject. This, however, has entirely disappeared, excepting a few fragments. He also constructed the first chart of the earth, according to astronomical and mathematical principles. He considered the northern half of the earth to be alone inhabited, and supposed that the portion thus occupied amounted to about one eighth of the whole surface. He found an ardent opponent to many of his views in the great astronomer of antiquity, Hipparchus of Nicæa.

A new era in the history of Geography begins with Strabo (66 B. C. to 24 A. D.). To him we owe the first extensive and complete work on the science (in seventeen books), almost entirely extant at the present day. In its preparation he passed many years in study and travel. In his view, the whole earth is inclosed by a great Atlantic Ocean, which forms four large gulfs; the Caspian Sea, the Persian Gulf, the Arabian Gulf, and the Mediterranean, the largest of all. The great island of the earth he divided into a northern and a southern half, assuming, however, for greater convenience, three grand divisions, Europe, Asia, and Libya; the limits of those are the Straits of Hercules (Gibraltar), the Arabian Gulf, and the Tanais (the Don). Iberia or Spain lies furthest west. East of this is the land of the Celts or Gauls (France), between the Pyrenees and the Rhine, parallel to these mountains. Britain has the shape of a triangle, north of which is the island Ierne (Ireland), the most northern part of the inhabited earth. Germany is only known at the mouth of the Albis or Elbe: further east, the entire northern

coast of the earth is unknown. The Alps rise along the boundary between Gaul and Italy, and to them are opposed the Apennines. Asia, separated from Europe by the Tanais and Mæotis, is divided into a northern and a southern half by the mountains of Tauris. The largest and most eastern portion of the earth is India. Libya, which is not as large as Europe, and with Europe in addition, is less than Asia, is of a triangular shape, the northern shore along the Mediterranean constituting the base; Egypt and Ethiopia constitute its most eastern portion. (For a map of the world according to Strabo, see *pl.* 8.)

Among subsequent geographers, one of the most distinguished is Claudius Ptolemæus, who flourished about the middle of the second century. He wrote a geographical work, which up to the sixteenth century continued to be the universal manual. He presents to us the most advanced stage of the knowledge of Geography as possessed by the ancients. The chief peculiarities of the Ptolemaic system are as follows (see the map of the world according to Ptolemy on *pl.* 8). Ireland (Iuernia) is no longer to the north, but to the west of Britain (Albion); to the north of Albion lie the Orcades, and still further north the Island of Thule. Scandinavia (Scandia) is an island smaller than Ireland. Even the Danish islands are mentioned, as Jutland (the Cimbric Chersonese). The Caspian (Hyrcanian) Sea is inland. Ptolemy extends Asia to the east far beyond the Ganges, and speaks of the land of the Sinæ (Chinese). Asia and Africa, he supposed to be connected, the Indian Ocean intervening simply as a great Mediterranean sea. Ceylon (Taprobane) he imagined to be the largest island on the earth; next to it extended from north to south, a group of 1378 islands. He makes mention of the Mountains of the Moon and the sources of the Nile in the interior of Africa, the River Niger, &c.; and on the western coast he laid down the Happy Islands, through which he drew his first meridian.

In the time of Herodotus the measure of length employed was the stadium, or the length of the Olympian racecourse. Various estimates have been made of the exact length of the stadium. From the best sources of information it would appear that this, the longest measure of length made use of in classical antiquity, contained 600 Grecian or 625 Roman feet. As the Roman foot contains nearly eleven French inches, this would make the stadium $570\frac{1}{4}$ French or Paris feet, equivalent to about $607\frac{1}{2}$ English feet, or less than $\frac{1}{6}$ of an English mile ($\frac{1}{16}$ of an English geographical mile of 2025 yards). We may therefore count 600 stadia to a degree. A Roman mile contained 5000 feet, and was equivalent to eight stadia, so that $1\frac{1}{4}$ of these go to the geographical mile, and 75 to a degree of the equator. The Persian parasang has been estimated at thirty stadia or $\frac{3}{16}$ of a geographical mile, so that there are twenty to a degree. An Egyptian schoenos contained two parasangs or sixty stadia; according to some authors, however, only thirty or forty. A gallic hour or leuga (leuca) contains 1500 Roman paces or twelve stadia: consequently, there are fifty to a degree.

The circumference of the earth, as is well known, amounts at the equator to 21,600 geographical miles, or 216,000 stadia. Eratosthenes estimated it at 252,000 stadia; Hipparchus at 275,000; Posidonius at first at

240,000, but subsequently at 180,000 stadia, or $\frac{5}{6}$ of its actual size. The last-mentioned estimate was accepted by most of the subsequent astronomers and geographers, even by Ptolemy.

The Greek compass or wind card (on *pl.* 8, according to Aristotle) is divided into eight main winds, which, from west round by north, are as follows: Zephyros, Argestes, Boreas or Aparctias, Cæcias, Apeliotes, Euros, Notos, Lips. Between Boreas and Argestes blow Thrascias or the north-north-west wind, and between Boreas and Cæcias, Meses, or the north-north-east wind. Two additional winds were subsequently added to these ten; phœnicias or south-south-east wind, and Libonotos or south-south-west; the twelve winds then divided the card into equal parts, so that excepting the four main winds, the rest had an entirely different signification from those on our card. Vitruvius enumerates twenty-four winds (see the wind card of the Romans on plate 8).

Plate 9 represents the *kingdom of Alexander the Great*. This renowned conqueror was originally only a king of Macedonia, a country of small extent, bounded on the east by Thrace and the Egæan Sea, south by Epirus and Thessaly, west by Illyria, and north by Dardania and Mœsia; it now constitutes part of Turkey in Europe. Philip, the father of Alexander, had already subjected numerous Thracian, Illyrian, and Dardanian tribes, and in fact all Greece, by the battle of Chæronea (338 B.C.). Alexander, after ascending the throne in 336 B.C., conquered the Thracians, Triballi, Getæ, and Illyrians, reduced Thebes, and first commenced his victorious career as Emperor of Greece, by his expedition against the Persians in 334 B.C. After the battle of the Granicus, he overran Asia Minor, passing through Syria, Phœnicia, and Palestine, to the borders of Egypt: Egypt he conquered without any difficulty, and founded, in 332, the city of Alexandria. After a pilgrimage to the Temple of Jupiter Ammon, in the Lybian desert, Alexander took up his march towards Central Asia, overthrew the Persian empire by the victory at Gaugamela or Arbela (331), and afterwards conquered Media, Parthia, Hyrcania, Margiana, Aria (329), Arachosia, Bactriana, and Sogdiana. In 327, Alexander crossed the Indus, Hydaspes, Acesines, and Hydraotes, as far as the Hyphasis (Sudletsch), until his warriors refused to go any further. He now returned by another route to the Hydaspes, embarked on the Acesines, and passing into the Indus, ultimately gained the great ocean. From the mouth of the Indus he returned by land through the deserts of Gedrosia and Carmania (Nearchus conducting his fleet through the Indian Ocean, the Persian Gulf, and the Euphrates) to Babylon, where he died in 323. After his death his empire fell to pieces, forming several smaller kingdoms, as: 1, the Macedonian Greek; 2, the Syrian or kingdom of the Seleucidæ (founded by Seleucus Nicator), which included the principal portion of the old Persian empire, and by whose downfall there arose various minor governments, as Bactria, Parthia, Armenia, Judæa, &c.; 3, the Egyptian empire under the Ptolemies; 4, Pergamos in Asia Minor, Pontus, Bithynia, &c. (See the small chart on *pl.* 9.)

Pl. 10 represents the *Roman Empire under Constantine the Great*.

This monarch, in 330 A. D., divided his colossal dominions into four great prefectures : Italy, Gaul, Illyria, and the East. Each of these was divided into dioceses, which again were subdivided into provinces ; of these there were 117 in all.

ITALY, THE FIRST PREFECTURE, consisted of three dioceses : Italy with Rome as its capital, Illyria with the capital Syrmium, and Africa with the capital Carthage. The *Diocese of Italy* was divided into three principal portions, Gallia Cisalpina (Upper Italy, excepting Savoy, but including a part of the Tyrol, and of Middle Italy) ; Italy proper (Middle Italy), and Græcia Magna (Lower Italy). In *Cisalpine Gaul* we have the provinces of *Carnia* (now Friaul, with the towns of Tergestum, now Trieste ; Vedinum, now Udine ; Aquileia) ; *Venetia* (towns Patavium, now Padua ; Vicentia ; Verona) ; *Istria* (Pola), *Gallia Transpadana* (Brixia, now Brescia ; Cremona ; Mantua ; Bergamum, now Bergamo ; Comum, now Como ; Mediolanum, now Milan ; Ticinum, now Pavia ; Augusta Taurinorum, now Turin) ; *Gallia Cispadana* (Placentia, now Piacenza ; Parma ; Mutina, now Modena ; Bononia, now Bologna ; Ravenna) ; *Liguria* (Genoa ; Lucca ; Nicæa, now Nice). In *Italy proper* we have the following divisions : 1, *Etruria*, the present Tuscany, with a part of the Papal States (Pisa ; Sena Julia, now Sienna ; Portus Herculis Libronis, now Livorno ; Perusia, now Perugia) ; 2, *Umbria* (Ariminum, now Rimini ; Sena Gallia, now Sinigaglia ; Urbinum Hortense, now Urbino) ; 3, *Picenum* (Ancona) ; 4, *Sabina*, with the provinces of the Marsi, Peligni, &c. ; 5, *Latium* (Rome ; Tusculum, now Frascati ; Tibur, now Tivoli ; Præneste, now Palestrina ; Terracina Velitræ, now Velletri ; Cajeta, now Gæta). *Græcia Magna*, or Lower Italy, was divided into the following provinces ; 1, *Campania*, now Terra di Lavoro (Capua Neapolis, now Naples ; Herculaneum ; Pompeii ; Stabia ; 2, the *Land of the Picentini* (Salernum, now Salerno) ; 3, *Samnium* (Beneventum) ; 4, *Land of the Hirpini*, and 5, of the *Frentani* ; 6, *Lucania*, now Basilicata and Principato citra (Præstum and Sybaris, now no longer in existence) ; 7, *Bruttii*, now Calabria (Rhegium, now Reggio) ; 8, *Apulia* (Venusia, now Venosa ; Barium, now Bari) ; 9, *Messapia* or Calabria (Brundisium, now Brindisi ; Hydruntum, now Otranto ; Tarentum, now Taranto). Here belong also the three great islands of *Sicily* (Messina ; Catania ; Toormina ; Syracuse ; Agrigentum, now Girgenti ; Panormus, now Palermo) ; *Sardinia* (Calaris, now Cagliari) and *Corsica*.

The *Diocese of Illyria* consisted of Illyria proper, or the east coast of the Adriatic Sea (now Dalmatia, most of Bosnia, and a portion of the present Croatia and Albania). Illyria was subdivided by the River Drilo into two parts, Barbarian and Grecian Illyria, the latter of which, with the cities of Durazzo and Albanopolis, was subsequently assigned to Macedonia ; Barbarian or Roman Illyria consisted of the provinces Japydia, Liburnia, and Dalmatia. Pannonia, which included the eastern part of Austria, Styria, Carinthia, and Carniola, the whole of Hungary between the Danube and the Sau, Sclavonia, and parts of Croatia and Bosnia, was divided into upper (or western) and lower (or eastern). Particular provinces were *Interamnia* between the Sau and the Drau, *Ripensis* or

Savia on the Sau, and the province of *Valeria* between Raab, the Danube, and the Drau. To *Upper Pannonia* belonged the cities of Vindobona (now Vienna), and Emona (now Laibach); to *Lower Pannonia* the cities of Arabona (now Raab), Acincum (now Ofen), Acimincum (now Peterwardin), Taurunum (now Semlin), Sirmium, the largest town in Pannonia, now in ruins. *Noricum* divided into Noricum Ripense in the north, and Noricum Mediterraneum in the South, including the greater part of Austria, Styria, Carinthia, and Salzburg, and embraced the cities of Lentia (now Linz), Juvavia (now Salzburg), Noreja, Celeja (now Cilly), Laureacum (now Lorch). Here belonged in addition the following provinces: *Vindelicia*, subsequently called Rhaetia Secunda, including north-eastern Switzerland, south-eastern Baden, the most southern portion of Wurtemberg and Bavaria, with the northern part of Tyrol, and Rhaetia (Augusta Vindelicorum, now Augsburg; Regina, now Regensburg or Ratisbon; Campodunum, now Kempten; Brigantium, now Bregenz; Batavia Castra, now Passau); *Rhaetia prima*, now Graubünden and Tyrol, with a part of Lombardy (Tridentum, now Trient; Veldidena, now Wilten; Teriole Oeni Pons, now Innsbruck; Clavenna, now Chiavenna; Curia, now Chur).

To the *Diocese of Africa* belonged the following provinces; *Cyrenaica* or Pentapolis (Ptolemais, now Tolometa; Arsinae, now Tochira; Berenice, now Benegasi; Cyrene the capital); *Syrtyca*, or Tripolitana (with three capitals, Leptis Magna or Neapolis, now Lebida; Oea or Oeca, now Tripoli; Sabrata). *Africa proper*, or the province of Africa, divided into the districts of Byzacium in the south (Adrumetum; Tysdrus; Capsa) and *Zeugitana* in the north (Tunes, now Tunis; Carthage, once the capital of the mighty Carthaginian nation, but long since in ruins; Utica next in importance to Carthage. *Numidia*, the present Algiers (Thabraca, now Tabarca; Hippo Regius, now Bona; in the interior, Zama, and Cirta, now Constantine). *Mauritania* divided into two provinces; the eastern, *M. Casariensis* (capital Caesarea); and the western, *M. Tingitana* (capital Tingis, now Tangiers). Under Diocletian or Constantine, Mauritania Caesariensis was divided into two provinces, Caesariensis in the west, and Sitifensis in the east; M. Tingitana was united with the Diocese of Spain.

THE SECOND PREFECTURE OF GALLIA consisted of three dioceses; Gallia in its restricted sense, Hispania, and Britannia. GALLIA (the present France, with Belgium, Holland, and parts of Germany, Italy, and Switzerland) was divided by the Emperor Augustus into the four provinces, Narbonensis, Aquitania, Lugdunensis, and Belgica, which, however, were divided by Constantine the Great or even by Diocletian into fourteen, and still later into seventeen provinces. *Gallia Narbonensis* or Braccata, the oldest Roman province before the time of Julius Caesar, was separated into five provinces: Narbonensis Prima et Secunda, Alpes Maritimæ, Viennensis, Alpes Graiæ, and Penninæ; it also included the provinces of Languedoc, Roussillon, Provence, Dauphiny, with the greater part of Savoy, Piedmont, and the cantons of Geneva and Valais (Narbo Mantius, now Narbonne, the

capital; Tolosa, now Toulouse; Massilia, now Marseilles; Telo Martius, now Toulon; Arelate, now Arles; Geneva Valentia, now Valence). *Aquitania* was divided into the three provinces, Novempopulana, Aquitania Prima, and A. Secunda; it embraced the districts of Gascony, Bearn, Auvergne, Guienne, Poitou (Burdigalia, now Bordeaux; Besunna, now Perigoux; Limonum, now Poitiers; Avaricum, now Bruges). *Gallia Lugdunensis*, previously Celtica, the largest of the four provinces, was divided into the four lesser provinces, Lugdunensis Prima, Secunda, Tertia, and Quarta, and included the provinces of Burgundy, Normandy, Brittany, Champagne, Maine, Touraine, Anjou (Lugdunum, now Lyons; Augustodunum, now Autun; Cabillonum, now Chalons on the Saone; Lutetia Parisiorum, now Paris; Rotomagnus, now Rouen; Genabum or Aurelianensis Urbs, now Orleans; Cæsarodunum, subsequently Turoni, now Tours). In conclusion, *Gallia Belgica* was divided into the five provinces, Belgica Prima et Secunda, Germania Prima et Secunda, and Maxima Sequanorum; it embraced the present Lothringia, a portion of Champagne, Picardy, Belgium, the left bank of the Rhine, southern Alsace, Franche-comté, and western Switzerland. The most important towns embraced within these limits were in the land of the Helvetii, Lacus Lausonius, now Lausanne; Eburodunum, now Yverdum; Salodunum, now Solothurn (Soleure); Turicum, now Zurich: in the land of the Sequani, their capital Vesontio, now Besançon; Tullum, now Toul, in the land of the Leuci; Devodunum, now Metz, principal town of the Mediomatrici; Argentoratum, now Strasburg; Noviomagus, now Spire; Mogontiacum, capital of Germania Prima or Superior, now Mayence; Borbeto Magnus, now Worms; Augusta Trevirorum, capital of Belgica Prima, now Trier; Confluentes, now Coblenz; Colonia Agrippina, now Cologne; Bonna, now Bonn: in the country of the Batavi, called Insula Batavorum; Lugdunum, now Leyden; Arenacum, now Arnheim; Noviodunum, now Nimwegen; Traiectum, now Utrecht; also Cortoriacum, now Courtray; Gesoriacum, subsequently Bononia, now Boulogne; Samarobriua, now Amiens; Cæsaromagus, now Beauvais; Noviodunum or Augusta Suessorum, now Soissons; Durocortorum or Remi, now Rheims; Durocatelauni or Catelauni, now Chalons sur Marne.

The *Diocese Hispania*, including the present Spain and Portugal, was divided by Augustus into three provinces: Bætica, Lusitania, and Tarraconensis. To these Constantine added the four provinces, Gallæcia, Carthaginensis, Baleares, and Mauritania Tingitana in Africa. *Bætica* embraced the southern part of Spain, the present Andalusia, or the provinces of Sevilla, Granada, and Cordova, the western half of Jaen, the eastern part of the Portuguese province Alemtejo, and the southern part of Estremadura (capital Hispalis, now Seville). Other towns are Gades, now Cadiz; Corduba, now Cordova; Malaca, now Malaga. *Lusitania* embraced the greater part of Portugal, and the Spanish provinces Estremadura and Salamanca (capital Augusta Emerita, now Merida; also Ebora, now Evora; Olisipo, now Lisbon, Salmantica, now Salamanca). *Hispania Tarraconensis*, the largest province, included the present Navarre, Arragon, and Catalonia, as also parts of Valencia and Castile: according to Pliny, it

contains 179 cities (capital *Cæsaraugusta*, now Saragossa; *Carthago Nova*, now Carthagera; *Valentia*; *Tarraco*, now Tarragon; *Barcino*, now Barcelona; *Pompelon*, now Pampelona). *Gallæcia* embraced the Spanish province of Galicia, the Portuguese province Entre Douro e Minho, and the western part of Leon and Asturia, subsequently the whole of Asturia (principal towns, *Braga*; *Brigantium*, now Corunna). On the *Balearic Islands* (Major and Minor, now Majorca and Minorca) we find the towns *Palma* and *Pollentia*, now Pollenza.

Of the British Islands, *Britannia* and *Hibernia*, the former only, and of that only the southern part of England, was in the possession of the Romans, who divided it into two provinces, *Britannia Superior* and *Inferior* (Scotland was known as *Caledonia* or *Britannia Barbara*). Four provinces were subsequently established: *Britannia Prima*, or the southern part; *B. Secunda* (Wales); *Maxima Cæsariensis* (the land between the Thames and the Humber); and *Flavia Cæsariensis* (the country north of the Humber to the Roman wall); to these was subsequently added a more northern province of *Valentia*. The principal towns of Roman Britain were *Londinum* or London; *Venta*, now Winchester; *Dunium*, now Dorchester; *Camalodunum*, Colchester; *Lindum*, now Lincoln; *Ratæ*, now Leicester; *Eboracum*, now York; *Luguvallum*, now Carlisle, &c.

THE THIRD PREFECTURE OF ILLYRICUM (the eastern Illyria) included all the country of Greece to the Danube, excepting Thrace and the true Illyria; it consisted of the Diocese of Macedonia (capital Thessalonica) and Dacia. To the former belongs not only Macedonia proper, but also the whole of Greece; Macedonia proper being divided into two smaller provinces, *Macedonia Prima*, including the coast, country, and the western mountain region, and *Macedonia Secunda* or *Salutaris*, embracing the northern mountain region; the capital of the former was Thessalonica, now Salonica, that of the latter, *Stobi*, now destroyed. *Pella* and *Philippi* are the only other towns worth mentioning.

Hellas, or *Greece*, was called *Achaia* by the Romans, and is naturally divided into three great sections. 1. *Northern Greece*, in the north of the isthmus of Corinth, and including the following provinces: 1. *Thessalia*, the largest of all the Grecian provinces (towns, *Pharsalia* *Larissa*; 2. *Acharnania* (towns, *Ambracia*, now *Arta*; *Actium*); 3. *Ætolia* (*Elæus*, now *Missolonghi*); 4. *Doris*; 5. *Locris* (*Amphissa*, now *Salona*; *Naupactus*, now *Lepanto*); 6. *Phocis* (*Delphi*, now *Castri*); 7. *Bæotia* (*Thebæ*, now *Thiva*; *Plataea*; *Leuctra*; *Lebadea*, now *Lavadia*; *Chæronea*; *Coronea*, near the present *Granitza*; 8. *Attica* (*Athens*, the capital of the kingdom of Greece, with the three harbors, *Piræus*, *Munychia*, and *Phalerus*); *Megaris* (*Megara*, the only city now a village of the same name). There also belongs here the province of *Epirus*, not included with *Achaia* (towns *Buthrotum*, now *Butrinto*; *Nicopolis*, now *Prevesa*; *Aulon* or *Aulona*, now *Balona*). II. *The Peninsula of Peloponnesus*, subsequently called the *Morea*, and embracing the following ten provinces: 1. *Corinthia* (capital *Corinth*); 2. *Sicyonia* (*Sicyon*); 3. *Phliasia* (*Phlius*); 4. *Achaia* (*Patræ*, now *Patras*); 5. *Elis* (*Elis*); 6. *Messenia* (*Massene*; *Corona*, now *Coron*; *Methona*, now

Modon); 7, *Laconia* (towns Sparta or Lacedæmon, near the present Mistra); 8, *Cynuria* (Thyrea); 9, *Argolis* (Argos, still extant; Nauplia, now Napoli di Romania); 10, *Arcadia* (Megalopolis; Mantinea; Orchomenos). III. *The Grecian Islands*. In the Ionian Sea may be noticed, Corcyra, now Corfu; Paxi, now Paxos and Antipaxos; Leucas or Leucadia, now Santa Maura; Ithaca, now Thiaki; Cephallenia, now Cephalonia; Zacynthus, now Zante; Cythera, now Cerigo; Aegina, now Eghina. Eubœa, still of the same name, but formerly called Negroponte (towns, Chalcis; Eretria; Carystus; Histiaea). Crete was the largest of the islands of Greece; it was called Candia by the Turks (the Isle of Cyprus belonged to the Prefecture and Diocese of the East). Among the Cyclades, so called from their lying in a circle about Delos, may be mentioned Delos, Paros, Melos, Andros, Tenos, Syros, Myconos, Ceos, Naxos, Gyaros, Cythnos, Siphnos, and Seriphos. Among the Sporadian Islands were included: Thasos, Samothrace, Imbros, Lemnos, now Stalimene, Ios, Thera, Astypalæa, Amorgos, &c. The other Sporadian Islands, as Rhodes, belonged to Asia. To the Diocese of Macedonia also belonged the so-called Grecian Illyria, Illyria in its most restricted sense, likewise Epirus Nova, which embraced a large portion of Modern Albania. The capital was Epidamnus, subsequently called Dyrrhachium and now Durazzo.

The *Diocese of Dacia* included the central part of Mœsia, south of the Danube, and by Aurelian called Dacia Aureliani. In it was not included the true Dacia to the north of the Danube, embracing Hungary beyond the Theiss, Siebenbürgen, Bukowina, Moldavia, and Wallachia. Subsequently there was distinguished a *Dacia Secunda*, or *Ripensis*, the region along the Danube, from the *Dacia Interior* or *Prima*, the southern strip in the interior to the borders of Macedonia; also *Dardania Prævalitana* and *Mœsia Prima*.

THE FOURTH PREFECTURE OF THE EAST was divided into five dioceses: Thracia, Pontus, Asia, Egypt, and the Orient or East in its more restricted sense. The *Diocese of Thracia*, with Constantinople (previously called Byzantium) for its capital, embraced a large part of the present Turkey in Europe, and was subdivided into the provinces, Mœsia Secunda, Scythia, Hæmimontus, Thracia, Rhodope, and Europa. In addition to the capital it contained the following towns: *a*, In *Mœsia Secunda*; Nicopolis on the Hæmus, now Nikopoli; Durostorum, now Silistria; Odessus, now Varna; *b*, in *Scythia*; Tomi, or Tomis, now Temeswar; Constantiana, now Costendsche; *c*, in the *Hæmimontus*; Adrianopolis, or Orestias, now Adrianople, or Edrene; *d*, in *Thracia*; Philippopolis, now Philippopoli; *e*, in *Rhodope*; Abdera, now Polystilo, or Asperosa; Ænus, now Enos; *f*, in *Europa*, besides Constantinople; Selymbria, now Selivria; Bisanthe, Rodosto, Perinthus.

The *Diocese Pontus* embraced eleven provinces; Bithynia, Galatia, Cappadocia Prima and Secunda, Paphlagonia, Honorias, Galatia Secunda, or Salutaris, Pontus Polemoniacus and Helenopontus, Armenia Prima and Secunda. *Bithynia*, the eastern part of which was named *Honorias*, had for its capital Chalcedon; Bithynium, subsequently Claudiopoliis, was the

capital of Honorias. Constantine divided *Galatia* into a northern part, G. Prima, and a southern, G. Secunda; Ancyra, now Angora, was the capital of the former, Pessinus that of the latter. *Cappadocia*, the most eastern province of Asia Minor, and now the Turkish province of Caramania, was separated into two provinces, Cappadocia Prima in the north, and Cappadocia Secunda in the south; the former had Cæsarea (previously Mazaca) for its capital, and the latter Tyane, now Kilis Hissar. *Pontus*, the most northern part of Asia Minor, included the present Pachalics of Trebisonde and Siwas; it was divided into an eastern part, P. Polemoniacus, and a western, Helenopontus (previously Pontus Galaticus): chief towns, Trapezus, now Trebisonde, under Trajan, the capital of Pontus Cappadocius; Amasia, capital of Helenopontus; Neo-Cæsarea, capital of P. Polemoniacus. The *Provinces of Armenia Prima and Secunda* together, constituted Lesser Armenia.

The *Diocese Asia* or *Asiana* formed eleven provinces; Asia Proconsularis, Hellespontus, Insulæ, Pamphylia, Lydia, Caria, Lycia, Lycaonia, Pisidia, Phrygia Salutaris, and Pacatiana. The Province *Asia Proconsularis* included the western coast of Asia Minor, from Cape Lectum to the mouth of the Mæander, or the greater part of the old districts of Æolis and Ionia, with the neighboring parts of Mysia and Lydia (towns, Pergamum, now Pergama or Bergama; Smyrna, Clazomenæ, Colophon, and Ephesus). The Province *Hellespontus* embraced Troas and most of the northern parts of Mysia. The Province *Insulæ* included all the islands belonging to Asia Minor, with Rhodes, situated on an island of the same name, for the capital. The most important of these islands are: Tenedos on the coast of Mysia, and Lesbos (capital Mitylene) on the coast of Ionia; Chios, now Scio; Psyra, now Ipsara; Samos, Icaria; on the coast of Caria, Patmos, now Patmo; Leros, Calymna, Cos, Nisyros, Telos, and Syme. The Province of *Pamphylia* was a narrow strip of coast in the south of Asia Minor, with Syde for its capital. The Province of *Lydia* contained only the southern part of ancient Lydia, the northern and smaller portion having been added to Phrygia under the name of Mæonia. The Province of *Caria*, the south-western part of the peninsula, embraced the present Turkish province of Alidinella and Mentecheli; in it was situated the town of Miletus. The Province of *Lycia*, a peninsula on the southern coast of Asia Minor, now forms the western part of the district Tekeh. *Lycaonia* had for its capital Iconium, now Konieh or Kunjeh. *Pisidia* included the district of Isauria. *Phrygia*, the most western of the interior divisions of Asia Minor, was divided into the Province, P. Salutaris, or Salutaria, the largest and most central portion of the country (capital Synnada), and P. Pacatiana (subsequently Capatiana), a long and narrow strip in the west, with Laodicea or Lycos as its capital. The most northern part of Phrygia was called P. Epictetus, the south-eastern P. Parorios.

The *Diocese Egypt* contained the following as the more important towns: 1. Lower Egypt; Alexandria, capital of the Empire of the Ptolemies, now Scanderick; Canopus; Athribis; Babylon, now Baboul, on the boundary between Middle and Lower Egypt; Pelusium. 2. *Middle*

Egypt; Memphis, capital of the whole of Egypt; Oxyrynchus, now Behnese; Hermopolis Magna, now Achmunim. 3. *Upper Egypt*, or Thebais; Tentyra, now Denderah; Captos, now Keft; Thebes, one of the oldest towns in Egypt and the whole world; Syene, now Assuan.

The *Diocese Orient* (in its more limited sense) was divided into fifteen provinces: Palæstina Prima, Secunda, and Tertia or Salutaris; Phœnicia; Phœnicia Libani; Syria Prima and Salutaris; Cilicia Prima and Secunda; Cyprus, Euphratensis, Osrhœne, Mesopotamia, Arabia Petræa, and Isauria; Palæstina or Judæa was divided into the region this side and beyond the Jordan. The former was cut up by the Romans into three districts, Galilæa in the north, Samaria in the middle, and Judæa in the south (the southern part of the latter was sometimes called Idumæa). The land beyond Jordan or Peræa was divided into six districts, Trachonitis or Trachon, Ituræa, Gaulanitis, Auranitis, Batanæa, Peræa. Of these provinces subsequently erected, *Palæstina Prima* embraced the largest and most northern part of Judæa with Samaria; *P. Secunda*, Galilæa and the northern part of Peræa; *P. Tertia*, southern Peræa, the southern part of Judæa, and a portion of Arabia Petræa. Prominent towns besides Jerusalem, the chief capital, are Cæsarea; Joppa, now Jaffa; Jericho, now Richa; Ascalon, now Askalan; and Gaza; all in Judæa. In *Phœnicia* are Tripolis, now Tripoli or Tarablus; Berytus, now Beirut; Sidon, now Saida; Tyre, the most important city of all; Aca, subsequently Ptolemais, and now Acca or St. Jean d'Acre. *Syria*, the present Soristan, was divided into two principal portions, Upper Syria, or Syria proper, and Lower Syria, usually called Coelosyria; the latter was the more southern portion, and, in a wider sense, likewise included Phœnicia and Palæstina. The Romans divided Upper Syria into ten provinces, Comagene, Cyrrhæstia, Pieria, Seleucis, Chalcidice, Chalybonitis, Palmyrene, Laodicene, Apamene, Cassiotis. Constantine the Great, however, united the two first into one province, Euphratensis; and Theodosius the younger divided the rest of the land into *Syria Prima* (the northern part, capital Antioch) and *S. Secunda*, or Salutaris (the southern part, capital Apamea). The most important towns were Samosata, capital of Comagene; Hieropolis, or Bambyce, capital of Cyrrhæstia, and subsequently of the whole province Euphratensis; Seleucia in Seleucis; in Palmyrene, Palmyra, now Tadmor; in Apamene, Apamea, capital of Syria Secunda; Emesa, now Hems, capital of Phœnicia Libanensis; in Cassiotis, Antiocha on the Orontes, now Antakia; in Coelosyria, Damascus, now Damask, and Heliopolis, now Baalbec. *Cilicia*, the most south-eastern coast land of the peninsula of Asia Minor, was separated into two parts, Cilicia proper, or level Cilicia, the largest and eastern portion, now Adana; and rugged Cilicia, or Tracheotis, the western portion, now called Itschil. Theodosius II. divided the former into two provinces, *Cilicia Prima* (the western part) and *C. Secunda* (the eastern). The original capital of Cilicia was Tarsus, now Tarso. Rough Cilicia became an appendage to Isauria. The province of *Cyprus* included only the island Cyprus (capital Salamis, subsequently Constantia). *Mesopotamia*, the region between the Euphrates and the Tigris, was divided into two parts,

Osroene in the west (capital Edessa, now Orrhoa or Orfa) and Mesopotamia proper, in the east, also called Mygdonia (capital Nisibis or Antiocha, now Nisib). *Arabia* was divided by Ptolemæus into A. Deserta, Petræa, and Felix. The northern part, A. Petræa, alone was in possession of the Romans. Here dwelt the Amalekites, Edomites or Idumæans, the Moabites, Ammonites, and Midianites. Petræa was the capital city.

Such was the extent and arrangement of the *Roman Empire* under the first Christian emperor, *Constantine the Great* (305–337 A. D.), who, in 330, changed his residence from Rome to Constantinople, the ancient Byzantium, thereby making the distinction into an eastern and a western Roman empire. The first actual division of the empire took place under the emperor Diocletian (284–305). Diocletian, in 285 A. D., took Maximian as his colleague, who nominated Constantius Chlorus as associate, Diocletian nominating Galerius; the empire had thus four rulers (from 291 A. D.). Of these, Diocletian governed all the eastern provinces beyond the Egæan Sea; Maximian took Italy, Africa, and the intermediate islands; Galerius, Thrace and Illyria; and Constantius, Britain, Gaul, Spain, and Mauritania. To the latter emperor succeeded his son Constantine the Great, in 306, who, in 312, after the victory over Maxentius, son of Maximian, became master of all the western provinces excepting Mauritania and North Africa. In 323 he conquered Licinius, and thereby came into possession of all the eastern provinces, and thus again united the whole empire under one sceptre. After his death in 337 A. D., the empire was divided again among his sons Constantine II., Constans, and Constantius II. The latter was sole emperor from 353–361, and to him succeeded Julian the Apostate to 363. In 394 A. D., Theodosius the Great again united the empire, but shortly before his death divided it among his sons Honorius and Arcadius, the former taking the western, and the latter the eastern empire. This division was permanent. The former empire (the capital of which, for a long time, was Ravenna) met with its downfall in 476, by the irruption of innumerable hordes of barbarians who swept over Europe towards the west and south. These consisted of the Turcilingi, the Goths, the Heruli, the Alans, the Seyri, and the Rugi, with Odoacer, king of the Turcilingi, at their head: this prince then ruled the whole of Italy. The last emperor, Romulus Augustulus, son of the general Orestes, and by him elevated to the throne in 476 A. D., hardly attained to the government; his predecessor, Julius Nepos, the last recognised emperor of the western empire, died in 480, after which Odoacer became king of Italy. The eastern Roman empire, also called the Byzantine or Greek empire, fell away by degrees, but lingered out a miserable existence until 1492, when Constantinople, with the remains of the empire, fell into the hands of the Asiatic Turks.

2. GEOGRAPHY OF THE MIDDLE AGES (*Plates 11 and 12*).

In *Plate 11* we present to our readers a map of Europe in the time of *Charlemagne*. The empire of the Franks was the most powerful in

existence at that period, extending over France, Switzerland, Germany, Italy, and great part of Hungary. The basis of the empire of the Franks was laid by Clodio, their first historical king, who, about 437, conquered the northern provinces of France. He was succeeded by his son Merovæus, from whom the first royal race of the Franks received the name of Merovingian. After ruling from 447 to 456, he was succeeded by Childeric, 456 to 481, after whom came his son Chlodvig I. (Clovis), king of the Salian Franks, and real founder of the Frankian monarchy. By his victory over Syagrius at Nogent, not far from Soissons, Clovis put an end to the Roman dominion in the now Frankish Empire. The battle of Tolbiacum, now Zulpéché, in 496, gave him the sovereignty over the Allemanni; in 508, he conquered all Aquitania, and all the West Gothic provinces in Gaul; and in 510 enlarged his empire by murdering all the other kings of the Franks.

On the death of Clovis, in 511, his dominions were parcelled out among his four sons, Clodomir, Childebert, Lothar I., and Theodoric, forming four kingdoms, with Paris, Orleans, Soissons, and Metz, as the capitals. The fourth kingdom was called Austrasia, and included, in addition to the original region, the Ripuarian Franks, the Duchies of Friesland, Thuringia, and Bavaria; the three first were subsequently united under the name of Neustria, to which was afterwards attached Britannia Minor or Armorica, the Brittany of the present day. In addition to Austrasia and Neustria, Gaul included two other principal countries, Burgundy and Aquitania. Burgundy, from 443 to 534, constituted a separate government, but was conquered in 534 by the British kings, and united with the kingdom of Orleans; it embraced Burgundy proper, the provinces taken in 544 from the east Goths, western Switzerland, and Dauphiny. In 508, Aquitania, the south-western part of France, was taken from the west Goths: in it were included the provinces of Auvergne and Gascony. Theodebert, the son and successor of Theodoric, destroyed the government of Thuringia, and turned it into a Frankish province. From 558 to 561, Clothar or Lothar I., son of Clovis, reigned alone; after his death, however, the kingdom was divided among his four sons. Subsequently we find only the two kingdoms of Austrasia and Neustria (with Burgundy) which Dagobert I. again united in 628, his brother Charibert residing at Toulouse as king of Aquitania. Fresh partitions again occurred, but in 687 Pepin of Heristal became actual ruler of the three kingdoms, under the title of Major Domus, subsequently a Duke and Prince of the Franks: Dietrich III. and his successors being kings only in name. To Pepin succeeded his natural son Charles Martel, who elevated himself to the position of Duke and sole lord of Neustria and Austrasia, after the death of Dietrich IV., in 737, and converted Friesland on the North Sea into a Frankish province. His sons Pipin the Short and Carlmann divided the kingdom; the latter, however, entering the cloister, and Childebert III. having been deposed, Pipin was crowned king of the Franks by St. Bonifacius in 752, and subsequently by Pope Zacharias. Shortly after, he conquered Septemania: this was the former Gallia Narbonensis, the region between the Cevennes.

Pyrenees, the Rhone, and the Mediterranean, whose western portion had already been snatched from the west Goths, by Clovis, in 511. The strip along the coast from the Pyrenees to the Rhone, with the capitals Carcassone and Narbonne, still, however, remained in their possession, subsequently falling into the hands of the Arabs. Shortly before his death, Pipin, in 768, divided the kingdom between his two sons, Carlmann and Charles (the Great), the former receiving Neustria and Burgundy, the latter Austrasia; Aquitania was completely subjected, in 769, and divided between the two. After the death of Carlmann, in 771, Charlemagne reigned alone; ultimately, however, he gave Aquitania to his son Louis I. and Italy to his other son Pipin. By the death of Pipin in 810, his son Bernard became ruler of Italy. This prince, in 774, conquered the entire Longobardian kingdom of Italy, with its capital Pavia, and in 778, Pamplona and a part of Northern Spain as far as the Ebro. In 785, the greater part of Germany, namely Saxony and Bavaria, fell into his hands; Hungary, as far as the Theiss, followed in 796, and Brittany in 799; in 800 he was crowned at Rome, Roman Emperor. In 804, the Saxons surrendered themselves entirely, and the Eider was recognised as the northern boundary of Bernard's dominions. Charlemagne died in 814; his son Louis the Pious (814-840) in 817 divided the kingdom between his sons Pipin (Aquitania), Lothar (co-ruler and future superior), and Louis (Bavaria, Carinthia, and Bohemia); his youngest son Charles the Bald, in 829, received Alemannia and Rhætia, in 837 Neustria, and after the death of Pipin, in 838, Aquitania also. At the conference of Verdun, in 843, Charles the Bald received West Franconia and the kingdom of France; Lothar I. (from 820, king of Italy, and emperor from 823) took the middle provinces, Lothringia, Elsass, Upper and Lower Burgundy, while Louis II. (the German) had East Franconia, or the kingdom of Germany. Charles the Stout (882-884) united all the states of the Carlovingian monarchy, but was deposed in 887 by the Germans.

Europe at one time consisted of the following monarchies. The *Greek Empire*, limited to the greater part of the present Turkey, Greece, Asia Minor, a part of Lower Italy and Sicily. 2. The *Bulgarian kingdom*, in what had previously been Lower Mœsia. 3. The *kingdom of the Avari*, much enfeebled by the attacks of Charlemagne subsequent to 791, and in 807 entirely overthrown by the Bulgarians. 4. The *kingdom of the Chazari* in Eastern Russia, much harassed in the ninth century by the inroads of the Petschenigenes or Patzinacites, a Turkish tribe, and in 1016 entirely subjected by the united power of the Russians and Greeks. 5. The *kingdom of the Slavi* in Western Russia, Poland, Prussia, Bohemia, Moravia, and Northern Germany as far as the Elbe. 6. The *kingdom of Sweden, Norway, and Denmark*. In Sweden, the posterity of Sigurd II. (794-824) ruled as kings in chief until 1060; King Harold Haarfager or the Fair-haired (863-933) first in Norway, founded a separate kingdom. Gorm the Old (855-936) is to be looked upon as the true founder of the Danish government, although in the time of Charlemagne, Gottfried or Göttrich, king of South Jutland, possessed considerable power in Den-

mark. 7. The *Seven Anglo-Saxon Monarchies* in England: Kent, Wessex, Sussex, Northumberland (previously divided into Bernicia and Deiria), Mercia, Essex, and East-Angles; these were all united in 827 into one, by Egbert, king of Wessex, who called himself king of England. In addition to these, there were the dominions of the Britons in Western England (Cornwallis, Cumberland) and Wales (North Wales or Cambria, South Wales or Damnonia); also of the Picts in Eastern Scotland, and of the Scots or original inhabitants of Ireland, in North-western Scotland, both united in 838 by King Kenneth II., together with many small powers in Ireland. These last-mentioned were divided into four sub-kingdoms: Ulster, Connaught, Leinster, and Munster. 8. In *Spain and Portugal* there existed at this time two governments; one the Arabic kingdom of Cordova (Al Hakem, 796–822), established by Abderahman I. in 756, and embracing the greater part of Spain and the whole of Portugal; the other, the Christian kingdom of Asturia or Oviedo, in the north-west (Alphonso the Chaste, 791–835). Count Garcias (853–870) first established the small kingdom of Navarre, after the Gascons in Navarre had in 831 withdrawn from the Frankish rule. 9. In *Lower Italy*, after the downfall of the Longobardian kingdom, there existed an independent principality, Benevent, established by Arigis, who, in 787, submitted to Charlemagne. Nevertheless, his son Grimoald revolted in 793, and died in 806, unconquered. His successor again submitted to a stronger power in 812, but in 818 Benevent was again independent. About 840 was established the Principality of Salerno.

Plate 12 represents *Europe at the time of the Crusades (1100–1250)*. In the centre of Europe, in Germany and the neighboring countries, we find the Roman-German Monarchy, whose kings, since the time of Otto the Great (962), had, for the most part, been crowned emperors and kings of Italy. Subject to them were the Duchies of Swabia, Bavaria, Carinthia, Saxony, Lothringia, &c. The kingdom of Burgundy and Arelat, in 1032, came into the possession of the Emperor Conrad, who was crowned in Geneva, king of Arelat; subsequently, however, the greater part of the kingdom broke up into independent governments, or came under the rule of the French. The north and largest portion of Italy belonged to the Monarchy, only the smaller part of Lower Italy to the Greek Empire. By degrees there arose in Upper Italy the Republics of Milan (1056), Pisa, Genoa, Pavia, &c. Lower Italy, however, excepting Naples and Benevent, became subject to the Normans, who erected several new states. These were: 1. The county Aversa and principality Capua, the latter established in 1062 by Count Richard I. 2. Apulia, a county from 1043, and a duchy (in connexion with Calabria and Sicily) from 1060. 3. Sicily, snatched by Count Roger in 1060–1090 from the Arabs. The universal supremacy of the Pope dates from the gift of the Margravine Matilda of Tuscany, who, in 1077 or 1079, bestowed upon the Church all her extended possessions and properties, consisting of Tuscany, Mantua, Parma, Reggio, Piacenza, Ferrara, Modena, and a part of Mark Ancona. Nevertheless, after the death of the Emperor in 1115, only a small portion of her goods went to the

Pope, and even after the addition of vast temporal possessions to spiritual supremacy, the Popes for a long time recognised the superiority of the Emperor. The boundaries of the present Papal States were assigned in 1209 by Emperor Otto IV. Since the time of Innocent III. (died 1206), the reigning Pope has been Primate of Rome and her territories; these, however, did not increase materially before the fifteenth century.

In eastern Europe we find the following governments: 1. The continually decaying *Eastern or Greek Empire*. From 1081–1185, the race of the Comneni had possession of the throne, but in 1185, Isaac Angelus established a new dynasty. From 1204–1261 there existed a Latin dynasty in Constantinople, established by Count Baldwin of Flanders, who, in 1204, captured Constantinople, at the head of the Crusaders: this was limited to the vicinity of the capital. 2. *Serbia*, after the death of the powerful Emperor, Emanuel I. Comnenus (1143–1180), became independent, and the Zupan (Prince) Stephan Venceanus (1195–1224) was in 1217 crowned king of Rascia. 3. In 1186 a new *Wallachian-Bulgarian kingdom* was established. John Asan I. (1217–1241) conquered Macedonia and the greater part of Thrace, and immediately assumed the imperial title. 4. The *kingdom of the Hungarians or Madschars* was ruled by Princes of the house of Arpad up to 1301. At this period Stephan I. the Holy received the royal crown from the Pope (about 997), and obtained Siebenbürgen; he introduced Christianity among his people. Kings Ladislaus I. (1077–1095) and Colomann (1095–1114) conquered the whole of Croatia, Slavonia, and Dalmatia, although the latter province subsequently fell into the hands of the Venetians. 5. The *duchy*, and afterwards *kingdom of Poland*, which, since 1130, had extended over Pomerania and Silesia, but, since 1163, had had a separate duke. For more than five centuries, from 840–1370, the race of Duke Piast, called from the plough to the sceptre, ruled over the land. In 965, Mieczyslaw I. embraced Christianity, and in 999 his son Boleslaw I. (992–1025) assumed the title of king. Boleslaw III., in 1138, divided the land among his four sons; but Wenzeslaw II., in 1305, again united most of the provinces. The principality, and subsequently the duchy of Lithuania, was independent of Poland. 6. The *Grand Principality of Russia*, under Wladimir I., who introduced Christianity, in 1015, among his twelve sons. The government descended to his son Jaroslaw I., who, in 1015, divided his dominions among his five sons, who held their residences in Kiev, Tschernigow, Perejoslawl, Wladimir, and Smolensk. Division after division subsequently took place, until there were fifty principalities, of which, however, the Grand Principality of Kiev was the most powerful, and claimed the supremacy. About the middle of the twelfth century, George Dolgoruki, the founder of Moscow, established a new principality in Western Russia, with Wladimir as the seat of government, which soon became more potent than all the rest; in 1155 he united Wladimir and Kiev, but in 1157 both principalities were again separated. From 1237–1477 Russia came under the rule of the Mongolian Tartars, and was tributary to the Khan of Kaptshak. The seat of government, from 1015–1169, was held at Kiev; at Wladimir, from 1169–1328, and after that at Moscow. Prussia and

Livonia were ruled, from the thirteenth century, by the German Order, called into being by Duke Conrad of Masowia, in 1230, to fight against the heathen Prussians; this Order, in 1237, became united with the Order of the Brethren of the Sword, and in 1243–1247, conquered Courland and Semgallia.

In Northern and Western Europe there existed the following governments: 1. *The kingdom of Denmark.* This attained the zenith of its power under King Canute II. the Great (1016–1035) who was at once king of Denmark, Norway (conquered 1031, lost 1036), and England (conquered in 1013 by his father, Sven), as also of Schleswig, ceded in 1035 by Conrad II. Under Magnus I. the Good, king of Norway, Denmark became a Norwegian province, but in 1044 Jarl Sven Magnus Estritson assumed the royal title, and established a new dynasty, which ruled Denmark up to the fifteenth century. Canute Laward, son of King Erik Eyegod, was, in 1115, the first Duke of South Jutland or Schleswig. Waldimar I. the Great conquered Rügen in 1168, Stettin and a part of Pomerania in 1173. King Canute IV. (1182–1202) subjected the Princes of Mecklenburg and the Duke of Pomerania, named himself king of Wenden, and in 1200 conquered Holstein. 2. *The kingdom of Norway,* with its capital Drontheim (since 1019); with the exception of the period of Danish dominion under Canute the Great, the race of Hakon ruled here up to 1319. 3. *Kingdom of Sweden.* The Swedish Prince Olof II., Skaut-Konung (993–1024), no longer called himself king of Upsala, the title which had been borne by his predecessors since the fifth century, but king of Sweden. In 1060, the dynasty of Yngling became extinct, from which time, up to 1127, the House of Stenkil held the sceptre, and afterwards, up to 1250, the Houses of Swerker and Bonde alternately. King Swerker, in 1137, united the whole country into one monarchy. 4. In *England*, after Hardicanute (son of Canute), Edward the Confessor (1041–1066), the last king of the Saxon dynasty, held sway; after him the Normans, under William the Conqueror, came into power. Henry I. (1100–1134) united Normandy with England, and thereby sowed the seed of perpetual war with France. The House of Plantagenet reigned from the year 1154. Henry II., the first of the line, acquired the dukedom of Brittany in 1169. In Scotland, which at that time also embraced Cumberland, Westmoreland, and Northern Northumberland (up to 1157), Macbeth became king in 1040, after the murder of Duncan, but in 1057 was replaced by Malcolm III., son of Duncan. Malcolm IV. surrendered Cumberland and Westmoreland to England, in 1157, and William the Lion-Hearted of Scotland (1165–1214) was obliged to yield up the whole country, although it soon seceded again. Ireland was governed in part by the Danes, whose chief points were in Dublin, Wexford, Waterford, and Limerick. In 1166, the English began the invasion of Ireland, at that time divided among many rulers, and in 1172, Henry II. took possession of the country in person. Nevertheless, the dominions of the English extended only over the southern and south-eastern parts of the island, together with a narrow strip of the north-east coast, while the whole north and north-east, Ulster and Connaught,

remained under the native sway. About the middle of the eleventh century, the Hebrides and neighboring islands withdrew from the Norwegian rule, and were united into a kingdom of the Islands, or of Man (Fingall king from 1066). 5. In *France* reigned the third dynasty of the Capetians from the time of Hugo Capet (987–997). At that time the king of France had little power over his more powerful subjects. The whole western part of France, from the shores of the Channel to the Pyrenees, Normandy, Brittany, Anjou, Touraine and Maine, Aquitania, with Auvergne and Gascony, were either immediately, or as fiefs, in the power of the English kings, whose French dominions were most extensive under Henry II., far exceeding those in England. The south of France belonged partly to Spain : the Count of Toulouse possessed Septimania, and the Tolousanian Gau, but after 1067, Count Raymond of Barcelona, by the purchase of Carcassone and Rasez, came into possession of part of his dominions. The remnant of the great kingdom of Burgundy, in connexion with France, formed a single dukedom. Robert, grandson of Hugo Capet, opened the line of Dukes of Burgundy, who ruled on to the fifteenth century. The royal dominion proper embraced only a part of the former dukedom of France, the counties Clermont, Dreux, Paris, Corbeil, Orleans; the vicomtés Bourges, Etampes, and Melun; the bishoprics of Noyon, Laon, and Beauvais. After the year 1200, Philip Augustus (1180–1223) became possessed of Touraine, Maine, Anjou, Normandy, a great part of Poitou, also of the counties Artois, Vermandois, Alençon, Amiens, Evreux, and Valois. His son Louis VIII. acquired Niort, Rochelle, and Avignon; while Louis IX., son of Louis VIII., obtained the dominions of the Counts of Toulouse, Beziers, Carcassone, Bourbon, Boulogne, &c. Thus within these short limits, the power of the French crown increased more than two-fold. Provence came likewise into possession of the royal house, by the marriage (in 1245) of the heiress Beatrice with Charles of Anjou, brother to Louis IX.

6. In *Spain* we find at this period the following great Christian powers : Castile, Leon, Arragon, and Navarre, in addition to that of the Arabs. Sancho the Great subjected all the Christian dominions in Spain, excepting Leon and Barcelona, which he then divided amongst his four sons, into Castile, Navarre (with Biscaya and Alava), Arragon, and Sobrarbe. The latter, in 1038, became attached to Arragon; as also Navarre, in 1076, this remaining attached until 1134, when Garcias IV. was chosen king. One of his successors, Sancho VII. the Wise (1194–1234), in 1200, lost Alava, Biscaya, and Guipuzcoa, to Castile. In 1037, Leon likewise became united to Castile, but Ferdinand I. of Castile, who inherited the throne, divided his dominions in 1064 amongst his sons, thus giving rise to three kingdoms, Castile, Leon with Asturia, and Galicia with Portugal. These, however, became again united in 1073, under Alfonso VI. In 1084, Toledo was snatched from the Moors, and converted into a royal possession; this people likewise lost all the land north of the Tagus (New Castile). After the death of Alfonso VI. in 1109, Galicia, Leon, and Castile, fell to Alfonso I. of Arragon, who married Urraca, daughter of Alfonso VI. After the

death of Alfonso I. in 1134, Alfonso VII., son of Urraca, by her marriage with Count Raymond of Galicia, was recognised king of Galicia, Leon, and Castile: he conquered the whole of La Mancha, as also Calatrava, was crowned Emperor of Spain in 1135, at Leon, and died in 1157. His dominions again became divided into the kingdoms of Castile and Leon, this separation lasting until 1230, when Leon, after the death of Alfonso IX., became permanently united to Castile. The Moors now lost Cordova in 1236, Murcia in 1243, Jaen and its territory in 1246, Seville in 1248, Xeres, Cadiz, Sidonia, &c., in 1256. The kingdom of Arragon, separated in 1134 from Castile, was in 1137 united to Barcelona, whose Count, Raymond, became king, as son-in-law of Ramiero II. king of Arragon. This kingdom was enlarged by the acquisition of Tudela in 1114, Saragossa in 1115, Tortosa 1138, Lerida 1149, Majorca 1229, Minorca 1233, and of the kingdom of Valencia in 1232-1245. The Moorish part of the peninsula likewise fell into numerous principalities, the most important of which were: 1, That of the Edrisides, Malaga, Algesiras, Ceuta, and Tangiers, 1015-1086; 2, that of the Abadides in Seville, to which were added Cordova in 1044, Malaga, Algesiras, Alicante, Murcia, &c., in 1086 (1026-1094); 3, that of the Beni-Alaftas in Badajoz to 1094; 4, that of the Dilnunides in Toledo, 1036-1085, and later in Valencia, 1085-1092; 5, that of the Alamerides in Valencia, Cuenca, &c., 1021-1085. In addition to these, there was the territory of Saragossa; subject to the Emirs residing there, were the vicegerents of Lerida, Tortosa, Huesca, and Tudela. All the Arabian kingdoms, except Saragossa, were, in 1097, subject to the race of Almoraviden or Morabethun, from which they were wrested fifty years later, by the race of Almohaden. Nevertheless, one province after another fell into the hands of the Christians, until there remained to the Moors only the kingdom of Granada, established in 1238 at Arjona, and the territory of Alicante. 7. Portugal was established as an independent country by King Alfonso VI. of Castile, in 1094, for Count Henry of Burgundy, the husband of his natural daughter Theresa; Alfonso I., son of Henry, acquired Lisbon in 1147, Evora in 1166, and called himself king, in 1139, after a great victory over the Arabians at Ourique. Alfonso III., who came into power in 1244, took Algarbia from the Arabians in 1250.

THE CRUSADES. Our limits permit us to present only a very brief outline in reference to the geographical history of the Crusades. The first took place in 1096, excited by the enthusiast, Peter of Amiens, sometimes called Peter the Hermit. Under Peter, his friend Walter the Moneyless, the priest Gottschalk, and Count Enrico of Leiningen, several hundred thousand crusaders, principally from the Rhine country, collected together, and marched through South Germany, Hungary, and Bulgaria, towards the Greek empire (Alexius Comnenus, Emperor). Having lost fully half their number by the attacks of the Hungarians and Bulgarians, the remnant was sent across the Bosphorus into Asia, by Alexius. Here they entered the dominions of Kilidsche Arslan, Sultan of Iconium, who nearly annihilated them at the battle of Nicæa, and in other contests. Subsequently appeared

on the stage, the main army under Godfrey of Bouillon, and his brother Baldwin of Flanders; Hugh the Great, Count of Vermandois and brother of the King of France; Duke Robert of Normandy, son of William, King of England; Count Raymond of Toulouse; Count Robert of Flanders; Count Stephen of Blois; Bohemund, Prince of Tarent, son of Robert Guiscard, &c. Godfrey of Bouillon, with his two brothers, Baldwin and Eustachius, set out on the 15th of August, 1096, and marched through South Germany and Hungary towards Thrace: Count Hugo of Vermandois, however, passed through Italy, and suffered shipwreck on the coast of Greece, thereby losing the greater part of his forces; the other leaders, with their divisions, followed subsequently. In May, 1097, the whole army, with its baggage, was collected before Nicæa in Bithynia, which soon surrendered. A victory at Dorylæum opened the way to Syria. Baldwin went towards the Euphrates, and established a sovereignty in Edessa, while the other crusaders besieged Antioch, gaining possession of the city on the 3d June, 1098, after a siege of nine months. The crusaders set out for Jerusalem in May, 1099, passing between Lebanon and the coast, and subjugating the Turkish Emirs of Tripolis, Tyre, Sidon, Ptolemais, and Cæsarea. They first beheld Jerusalem on the 6th of June, 1099, and on the 15th of July the city was taken by storm. A Christian state was then established, and Godfrey of Bouillon chosen as its head, who maintained it at the siege of Askalon against the Sultan of Egypt. At the same time, Tancred set up a government in Tiberias, Raymond of Toulouse one in Laodicea, &c. The harbors of Ptolemais, Tripolis, and Sidon, were subsequently taken, with the assistance of the Genoese, and afterwards Tyre also. In 1144, the Christians lost Edessa, the bulwark of their dominion in Asia; this started the second crusade, preached by Abbot Bernard of Clairveaux.

The second crusade commenced in 1147. At its head were the Emperor Conrad III., and King Louis of France; who were followed by 140,000 knights and about a million of foot. The German army set out in the spring of this year, and passing through Hungary and Greece, sailed across to Asia. Conrad selected the shortest but more dangerous way through Iconium; but the incessant attacks of the Turks wasted away his army, and with but a feeble force he escaped to Constantinople. Louis, who started later, reached Attalea in Pamphylia, with but a small part of his force, with which he set out for Antioch. Meeting with Conrad and Baldwin III., they laid siege to Damascus in 1148, which, however, remained unsubdued. In 1149, the European princes returned to their homes.

The third and fourth crusades were incited by the capture of Jerusalem by Saladin, in 1187, after having previously taken Sidon, Joppe, Berytus, Ptolemais, &c., and conquering the Christian army under Guido, at the battle of Tiberias. This time, the cross was taken up by Frederick I., Henry II. of England (who, dying soon after, his place was supplied by his son Richard the Lion-Hearted), and Philip Augustus of France. In January, 1189, the German army set out from Ratisbon: the emperor being accompanied by his second son Duke Frederick of Swabia, as also by Duke Berthold of Meran, and Ottokar of Styria, Markgrave Herman of Baden,

Counts Adolf of Holstein and Rupert of Nassau, the Bishops of Würzburg, Münster, Osnabrück, Meissen, and others. The route through the Grecian empire had to be forced at the point of the sword, and the Emperor Frederick reduced Philippopolis, Adrianople, Nicopolis, Demotica, &c., until the Greek Emperor, in March, 1190, granted the right of way. The army crossed the Hellespont to Asia in Grecian ships, and May 17, attacked the residence of the faithless Sultan of Iconium, passing then through Cilicia to the city of Seleucia on the River Calycadnus: here the emperor, having imprudently thrown himself into the water, was drowned by the torrent on the 10th of June, 1190. His army then passed by Tarsus, Antioch, and Tyre, to Ptolemais, which had been besieged since 1189, by King Guido. The kings of France and England went to Palestine by sea. Philip Augustus, accompanied by Duke Hugo III. of Burgundy, the Counts of Poitou, Flanders, Blois, Perche, Rochefort, Champagne, Sancerre, Dreux, Clermont, Soissons, Vendome, &c., sailed in the summer of 1190 from Genoa, and King Richard of England from Marseilles. In Messina, the armies of both united, and after spending the winter in Sicily, landed near Ptolemais, in April and June, 1191, this place capitulating on the 13th July, 1191. The titular king of Jerusalem, Guido of Lusignan, transferred his claim to Jerusalem, to Count Henry of Champagne, nephew of King Richard, himself establishing a new kingdom on the Island of Cyprus, which lasted nearly three hundred years. In September, 1192, Richard returned to Europe: Philip Augustus, as well as the German army, had left long before.

The Emperor Frederick II. undertook the fifth crusade. This prince had made a vow to that effect on ascending the throne, to which he was doubly pledged, having married the daughter of the titular king of Jerusalem (the Count of Brienne), and having himself assumed the title of king of Jerusalem. His expedition of 1227 was a failure, but in 1228 it was again repeated, and the emperor made a successful debarkation at Ptolemais, reached Joppe in November, and in February 18, 1229, concluded a truce of ten years with the Sultan of Egypt; in this time, Jerusalem, and most of the region belonging to it, fell into the hands of Frederick. This monarch entered Jerusalem, placed the crown on his own head on the 18th of March, and by the end of May, returned to Brundisium. Jerusalem was again lost in 1244, by the inroads of a troop of Chowaresmians, who fled before the Mongols.

The sixth crusade was undertaken by Louis IX. of France, in 1248. On the 25th of August, the crusaders embarked at Aigues-Mortes, and reached Cyprus by the middle of September: here they remained until the spring of 1249. After Pentecost, 1249, the army anchored before Damietta, and captured the town. Here it remained until the 20th of November, when it set out along the Nile for Cairo. This city, however, was never reached, the whole French army, with its king, having been taken prisoners in April, 1250. In consequence of a treaty of peace with the Sultan, Louis returned to Damietta, went thence to Ptolemais, and finally returned to Europe, in April, 1254. A second crusade, undertaken by Louis, in 1270, became converted into an expedition against Tunis.

The Christians still possessed a few fortified towns in Palestine and the coast of Syria, namely, Antioch, Tripolis, and Ptolemais. In May, 1291, the latter, and the most important, fell into the hands of the Sultan of Egypt, after which the remainder either surrendered peaceably, or were captured.

GEOGRAPHY OF MODERN TIMES (*Plate 13*).

Plate 13 represents *Europe before the French Revolution (1789)*. The political arrangement of Europe in the above-mentioned year, differed essentially from that which prevails at the present day.

Germany, with Joseph II. for its head, consisted at that time of more than three hundred greater and smaller states, most of which were distributed in the ten circles of Maximilian I. Six of these were defined by this emperor in 1500, at the imperial diet of Augsburg, namely, those of Franconia, Bavaria, Swabia, the Upper Rhine, Westphalia, and Saxony; the remaining four were added at the diet of Cologne, in 1512, viz. those of Austria, Burgundy, the Lower Rhine, and Upper Saxony: this arrangement was confirmed at the diet of Worms and Nürnberg, in 1521 and 1522. The distribution into circles was, however, very incomplete, owing to its not including all the positions in the empire. The components of the individual circles were as follows:

I. The AUSTRIAN CIRCLE, the largest of all, had only the following nobility: the Archduke of Austria (who, for centuries, was both Roman emperor and king of Germany), the Bishops of Trent and Brixen, the German Orders and the Princes of Dietrichstein. Its constituents were:

1. The *Grand-Duchy of Austria*, called also Lower Austria, and in old decrees the *Niederland*, consisting of two portions, one with Vienna, the other with Linz, as the chief towns.

2. *Inner Austria*, consisting of the Duchies of Steiermark or Styria, Carinthia, and Carniola (capitals Grätz, Klagenfurt, and Laibach); of Austrian Istria (Mitterburg and Capo d'Istria); of Austrian Friaul (Gradisca, Görz, Tolmein); and of the coast (Aquileia and Triest).

3. *Upper Austria*, or the county of Tyrol (capital Innsbruck), with Montfort, Bregenz, Bludenz, and Sonneberg.

4. *Further Austria*, consisting of the Austrian Breisgau (capital, Freiburg), and Swabian Austria (Burgau, Nellenburg, Altorf and Ravensburg, Hohenberg; five towns on the Danube, Munderkingen, Waldsee, Sulgau, Riedlingen, and Mengen, several Monasteries, and the towns of Constance, Zell, Chingen, &c).

5 and 6. *Bishoprics of Trient and Brixen*.

7. *Two Commanderries of the German Order*.

8. *Trasp* in Tyrol belonging to the Prince Von Dietrichstein.

II. The BURGUNDIAN CIRCLE embraced the Austrian Netherland with the capital Brussels. The subdivisions were:

1. Duchy of Brabant (in part), with the towns Löwen, Brussels, and Antwerp.

2, Mecheln; 3, Limburg; 4, Luxemburg; 5, Gelderland (in part, capital Roermonde); 6, Flanders; 7, Doornik or Tournay; 8, the Free Lands (including Middelburg and Ostende; 9, Hennegau (capital, Mons); 10, Namur or Namen.

III. The CIRCLE OF WESTPHALIA, likewise called Lower Rhenish Westphalian Circle, whose directors were the Bishop of Münster, and alternately the Electors of Brandenburg and of the Palatinate included: 1, the Bishoprics of Münster, Paderborn, Lüttich, and Osnabrück; 2, the Abbacies, Corvey, Stablo, and Malmedy (united), Werden, St. Cornelis-Münster, Essen, Thorn, and Herford; 3, the Duchies of Cleves and Geldern (in part), both Prussian; Julich and Berg (capital, Dusseldorf), Oldenburg; 4, the Principalities of Minden, East Friesland, and Mörs, all belonging to the king of Prussia; Verden, Nassau; 5, the Counties Mark, Ravensburg, Tecklenburg, and Lingen, belonging to the king of Prussia; Wied, Sayn, Lippe, Bentheim, Steinfurt, Virnenburg, Gronsfeld, Reckheim, Holzapfel, Blankenheim and Gerolstein, Kerpen and Lommersum, Schleiden, Hallermünde, Fagnolles, Schaumburg, Hoya, Diepholz and Spiegelberg, Rietberg, Pyrmont; 6, Anhalt, Winnenburg and Beilstein, Gehmen, Gimborn and Neustadt, Wickerad, &c.; 7, the three towns, Cologne, Aachen (Aix la Chapelle), and Dortmund.

IV. The KUR RHINE CIRCLE embraced: 1, the Electorate of Mentz; 2, the Electorate of Trier; 3, the Electorate of Cologne; 4, the Palatinate; 5, the Principality Arenberg; 6, Coblenz; 7, Niederisenburg; 8, Beilstein; and 9, Rheineck.

V. The UPPER RHINE CIRCLE embraced: 1, the five Bishoprics, Worms, Speier, Strasburg, Basel, and Fulda; 2, Weissenburg; 3, Hertersheim; 4, Prüm and Odenheim; 5, Hesse; 6, Simmern, Lautern, and Veldenz; Zweibrücken, Hersfeld, Waldeck, Nassau in part, Wiesbaden; 7, Sponheim, Salm, Hanau-Münzenberg, Solms, Königstein, Oberisenburg, Leiningen, Wittgenstein, Falkenstein, Kriechingen, and Wartenburg; 8, Reipoltskirchen, Hanau-Lichtenberg, Bretzenheim, Dachstuhl, and Ollbrück; 9, the five free towns of Worms, Speier, Frankfurt on the Maine, Friedberg, and Wetzlar.

VI. The SWABIAN CIRCLE, whose Director and most powerful prince was the Duke of Würtemberg, embraced: 1, the Bishoprics Constance and Augsburg; 2, Ellwangen, Kempten, Lindau, and Buchau; 3, Würtemberg and Teck; 4, Baden; 5, Hohenzollern Sigmaringen and Liechtenstein; 6, Thengen and Oettingen; Stühlingen, Baar, &c.; Kletgaw; 7, twenty Abbacies and one Provostship; 8, twenty-eight Manors and Counties of the Houses Waldburg, Fugger, Königsegg, &c.; 9, thirty-one free cities, as Augsburg, Ulm, Esslingen, &c.

VII. The BAVARIAN CIRCLE embraced: 1, Salzburg; 2, Freising, Regensburg, and Passau; 3, Berchtesgaden; 4, Lower and Upper Münster; 5, the Duchy of Bavaria; 6, Neuburg and Sulzbach; 7, Leuchtenberg and Sternstein; 8, Haag and Ortenburg; 9, Ehrenfels, Sulzbürg, Pyrbaum, Hohenwaldeck, and Breitenneck; 10, the free town Reichsstädt.

VIII. The **FRANCONIAN CIRCLE** embraced the Bishoprics Bamberg, Würzburg, and Eichstädt ; 2, Mergentheim and Franconia ; 3, Kulmbach (or Baireuth) and Ansbach, Brandenburg ; 4, Henneberg and Schwarzenberg ; 5, Hohenlohe ; 6, Castell, Wertheim, Rieneck and Erbach, with six manors ; 7, five free towns, Nürnberg, Rothenburg, Windsheim, Schweinfurt, and Weissenburg.

IX. The **CIRCLE OF UPPER SAXONY** included : 1, Saxony ; 2, Mark Brandenburg ; 3, the dominion of the Dukes of Saxony of the Line of Ernest (Weimar, Eisenach, Coburg, Gotha, and Altenburg) ; 4, Pomerania ; 5, Anhalt ; 6, Quedlinburg and Walkenried ; 7, Schwarzburg, Mansfeld, Stolberg, and Wernigerode ; 8, the dominions of the Counts and Princes of Reuss, those of the Counts of Schönburg and the County Hohenstein.

X. The **CIRCLE OF LOWER SAXONY** included : 1, Magdeburg ; 2, the dominions of the Electorate of Brunswick-Lüneburg, consisting of Bremen, Lüneburg, Grubenhagen, and Kalenberg ; 3, Wolfenbüttel and Blankenburg ; 4, Halberstadt ; 5, Mecklenburg-Schwerin and Mecklenburg-Güstrow, also Schwerin ; 6, the Duchy of Holstein ; 7, Hildesheim ; 8, Saxon-Lauenburg ; 9, Lübeck ; 10, Ratzeburg ; 11, the six free cities of Lübeck, Goslar, Mühlhausen, Nordhausen, Hamburg, and Bremen.

The following territories, not included among the preceding ten circles, also belonged to Germany : 1, Bohemia and Moravia, belonging to the House of Austria ; 2, Upper and Lower Lusatia ; 3, Mömpelgard and Homburg ; 4, Arch, Wasserburg, Freudenberg, Hörstgen, Rheda, Jever, Kniphausen, Dyck, Schaumburg, &c. ; 5, Kappenberg, Elten, and Burtscheid ; 6, the three circles of the immediate nobility in Swabia, Franconia, and on the Rhine ; 7, several places owned and ruled in common by more than one family ; 8, six free villages, and the free people in Swabia occupying thirty-nine villages and hamlets.

Besides Germany, Europe in 1789 contained the following states, of which eight (including the Electoral Monarchy of Poland) were republics, and one under the order of St. John ; the remainder were ruled by two emperors, one Grand Sultan, nine kings, one pope, one grand duke, three dukes, and one prince.

I. The *Kingdom of Portugal*, in its present extent, only arranged differently.

II. The *Kingdom of Spain*, likewise of its present limits, and divided into twenty-nine provinces: Madrid, Toledo, Cuença, Guadalajara, and La Mancha (New Castile) ; Burgos, Soria, Segovia, Avila (Old Castile) ; Leon, Palencia, Toro, Valladolid, Zamora ; Salamanca (kingdom of Leon) ; kingdom of Granada or Upper Andalusia ; kingdom of Galicia ; Sevilla, Cordova, Murcia, Jaen (Lower Andalusia) ; Asturia, Estremadura, Arragon, Valencia, Majorca (embracing the Balearic and Pithyusian islands), Catalonia, kingdom of Navarre, and the united districts of Guipuzcoa, Alava, and Biscaya. In addition to this there was the town of Antequera, which was assigned to no province.

III. The *Kingdom of France*, with limits much as at present, but including the Duchy of Bouillon, as also the fortified towns Philippeville, Marienburg,

Saar Louis, and Landau, which, in 1814 and 1815, were ceded to Belgium, Prussia, and Bavaria; and not embracing the then papal counties Avignon and Venaissin. It was divided, in a military point of view, into the following forty-one governments: Paris, Isle of France (capital Soissons); Picardy (cap. Amiens); Boulonnais (cap. Boulogne); Artois (Arras); Champagne and Brie (Troyes); Bourgogne (cap. Dijon); Dombes (cap. Trevoux); Dauphiny (cap. Grenoble) with the principality Orange; Provence (cap. Arles); Languedoc (cap. Toulouse); Foix; Roussillon (cap. Perpignan); Navarra and Bearn (cap. Pau); Gayenne and Gascogne (cap. Bordeaux); Saintonge and Angoumois (cap. Saintes); Rochelle and Aunis (cap. Rochelle); Poitou (cap. Poitiers); Bretagne (cap. Rennes); Normandy (cap. Rouen); Maine and Perche (cap. Le Mans); Orleanois (cap. Orleans); Nivernois (cap. Nevers); Bourbonnois (cap. Moulins); Lyonnois (cap. Lyon); Auvergne (cap. Clermont); Limousin (cap. Limoges); La Marche (cap. Gueret); Berry (cap. Bourges); Touraine (cap. Tours); Anjou (cap. Angiers); Saumur (cap. Saumur); Flanders and Hennegau (cap. Lille); Messin and Verdunois (cap. Metz); Lorraine and Bar (cap. Nancy); Elsass (cap. Strasburg); Franche-Comté (cap. Besançon); Corsica (cap. Bastia).

IV. The *Swiss Confederacy* consisted of thirteen Cantons, namely: Zurich, Bern, Luzerne, Uri, Schwyz, Unterwalden, Zug, Glarus, Basle, Freiburg, Solothurn or Soleure, Schaffhausen, and Appenzell. In addition to these there were twenty-three Landvogties (seven of them Italian), and two cities, which several Cantons possessed in common: Thurgau, Rheintal, Sargans, Gaster, Granson, Baden, Bellenz, &c., with ten allied or associated places: St. Gallen, Graubünden, the Valais, the town of Muhlhausen in Elsass, Neuenburg, Geneva, and the Bishopric of Basle (in part).

V. The *United Netherlands* constituted a republic from the time of their liberation from the Spanish yoke in the sixteenth century. They consisted of seven smaller republics or sovereign states: Guelderland, Holland, Seeland, Utrecht, Friesland, Oberyssel, and Gröningen, with Drenthe. In addition to these were portions of Brabant (cap. Herzogenbusch), Antwerp (cap. Breda), Guelderland (cap. Venloo), and Flanders, which had been conquered by the seven united provinces. A hereditary Stattholder stood at the head of the common republic.

VI. The *Kingdom of Great Britain and Ireland*, in its present extent and arrangement, although not united into a single government with one parliament. The islands of Helgoland and Malta at that time did not belong to England.

VII. The *United Kingdom of Denmark and Norway*, each in its present arrangement and extent. Of the latter, only the Faroes remain to Denmark. The Island of Helgoland, now English, belonged to Denmark up to 1814.

VIII. The *Kingdom of Sweden*, at that time united with Finnland and not with Norway, was divided into five sections; 1, Sweden proper, subdivided into Upland, Södermannland, Nerike, Westmannland, and Dalarne or

Dalecarlia; 2, the Gothic dominion, divided into eastern, western. and southern; 3, Norrland or Nordland; 4, Swedish Lapland; 5, Finland. In addition to this, the crown held in Germany a portion of Pomerania, with the island of Rügen, and Wismar, at present a town of Mecklenburg.

IX. The *Russian Empire*. The extent of this empire, in 1789, was much less than at the present time, as it did not include the following countries: Finland, with a part of Lapland, Curland, Poland with Lithuania, Volhynia with Podolia, Bessarabia, Moldavia east of Pruth, and the greater part of the region of the Caucasus. It was divided into the following sections: 1, St. Petersburg or Ingermannland; 2, Riga or Livonia; 3, Reval or Esthonia; 4, Wiburg or Carelia, with a part of Finland; 5, Olonetz; 6, Archangel; 7, Novogorod; 8, Pleskow; 9, Twer; 10, Jaroslau; 11, Wologda; 12, Kostroma; 13, Wjatka; 14, Perm; 15, Tobolsk; 16, Moscow; 17, Tula; 18, Kaluga; 19, Smolensk or White Russia; 20, Polozk, and 21, Mohilew (these two were taken from Lithuania in 1772); 22, Orel; 23, Novogorod-Sawersk; 24, Tschernigow; 25, Charkow; 26, Kursk; 27, Woronesch; 28, Rjäsan; 29, Wladimir; 30, Tambow; 31, Saratow; 32, Pensa; 33, Nischnei-Novogorod; 34, Simbirsk; 35, Kasan; 36, Ufa, with the province of Orenburg; 37, Kolywan; 38, Irkutsk; 39, Kiew; 40, Iekaterinoslaw; 41, Tauria or the Krimea; 42, Caucasus, consisting of the provinces Caucasus (cap. Asow), and Astrachan.

X. The *Kingdom of Prussia* (at one time a duchy, but a kingdom since 1701). This was divided into East and West Prussia, the latter consisting of the portion of Poland ceded to Russia in 1772.

XI. The *Republic* or the *Elective Monarchy of Poland* was divided into three principal portions: 1, Great or Lower Poland containing the Vayvodeships of Posen, Kalisch, Gnesen, Sieradz, Wielun, Rawa, Lenczyc, Brzesc, Inowracław, and Dobrzin (these three formed the district Cujavier), Plock, Masuren, also the town of Dantzig (almost entirely independent, however), and Thorn; 2, Lesser or Upper Poland, with the Vayvodeships of Cracow, Sandomir, Lublin, Podlachia (capital Bielsk), Chelm, Volhynia (cap. Luck), Podolia (cap. Kaminiec Podolski), Lithuania, and Kijow (part of the Ukraine); 3, Grand Duchy Lithuania, consisting of Lithuania Proper (cap. Wilna), Lithuanian Russia (Podlesia, Black Russia, and a part of White Russia), and Samogitia.

XII. The *Duchy of Courland and Semgallia* had its own duke, but was subject to Poland.

XIII. The *Austrian Dominions beyond Germany and Italy* were much as at present, excepting that Galicia was smaller, and the greater part of Dalmatia was wanting: 1, the kingdom of Galicia and Lodomeria (previously the principalities Halitsch and Wladimir, forming Red Russia, and torn in 1772 from the Republic of Poland) excepting Cracow, but including Bukowina taken from the Turks in 1777; 2, kingdom of Hungary with the kingdoms of Slavonia and Syrmia, Croatia and Dalmatia, arranged in ten provinces; Raab, Pesth, Neutra, Fünfkirchen, Agram, Grosswardein, Neusohl, Munkatsch, Kaschau, Temesch (Banat); 3, the Croatian and Slavonian Military Limits; 4, the Grand Duchy Siebenbürgen.

XIV. The *Republic of Ragusa* under the protection of the Grand Turk, and tributary to him, now belonging to Austria as a part of Dalmatia.

XV. The *Turkish Empire*, whose European dominions at that time embraced Bessarabia and that portion of Moldavia lying on the left or eastern bank of the Pruth, both subsequently ceded to Russia; also, the present kingdom of Greece. The now nearly independent Principality of Servia, at that time (to 1801) formed a viceroyalty.

XVI. *Italy*, with which we here conclude, embraced the following states, excluding the island of Corsica, which belonged to France. 1. Kingdom of Sardinia, consisting of the Duchies of Savoy (embracing Chablais, Faucigny, Genevois, Tarantaise, and Maurienne) and Montserrat, the Principality of Piedmont (with the Duchy of Aosta and the County of Nizza), a portion of the Duchy of Milan, and the island of Sardinia. 2. The Austrian possessions, consisting of the Duchies of Milan (the greater portion) and Mantua, and the Principalities of Castiglione and Solferino. 3. The Duchies of Parma, Piacenza, and Guastalla. 4. The Duchy of Modena, with Reggio, Correggio, Mirandola, Massa, and Carrara. 5. The Principality of Monaco (under French protection). 6. The Republic of Venice. Her dominions embraced, in Italy, the Duchy of Venice, the provinces of Padua, Bassano, Verona, Vicenza, Brescia, Bergamo, Erema, the peninsula Rovigo, the Mark of Treviso, the District of Friaul and Istria. Out of Italy the Venetian possessions consisted of parts of Dalmatia (Zara, Sebenigo, Trau, Spalatro, and islands), Albania, and the seven Ionian Islands: all these, excepting the last, are Austrian. 7. The Republic of Genoa: her territory was divided into the Riviera di Levante or the eastern part, the Riviera di Ponente or the western part, and Finale; it now constitutes the Sardinian Duchy of Genoa. 8. The Grand Duchy of Tuscany, divided into the old state or the Grand Duchy proper (Florence, Pisa, and Livorno), and the new state or Siena, acquired in 1557. 9. The States of the Church; divided into Rome with her territory; Campagna di Roma and Maritima; Patrimonio di S. Pietro; Duchy of Castro and County of Ronciglione; Umbria or the Duchy of Spoleto, with Camorino, Orvieto, Perugia, and Castello; Mark Ancona with the Duchy Urbino and the city Fano; Romagna, the territory of Bologna, and the Duchy Ferrara. In addition to these, the Pope possessed, as now, the Principality of Benvenuto, and in France the Counties Avignon and Venaissin, the two latter subsequently ceded to France. 10. The Republic of Lucca, and 11, Republic of San Marino. 12. The kingdom of the two Sicilies, consisting of the kingdoms of Naples and of Sicily. The former was divided into twelve districts: Terra di Lavoro, Principato Citra, Principato Ultra, Basilicato or Matera, Northern Calabria, Southern do., Terra d'Otranto, Terra di Bari, Capitanata, the Abruzzi, Teramo. Sicily was divided into three districts, Val di Mazzara (cap. Palermo), Val Demone (cap. Messina), and Val di Noto (cap. Catania). Besides these, the king of the Sicilies possessed the Stato degli Presidi, consisting of the Principality Piombino and the island Elba, now united to Tuscany. 13. The

Islands of Malta, Gozzo, and Comino, possessed by the Order of Knights of St. John, to whom they had been given by Charles V.

SPECIAL OR POLITICAL GEOGRAPHY.

I. EUROPE (*Plate 14*).

The greater portion of the population of Europe belongs to the Indo-European race, and is divisible into the following families : 1, the Germanic or Teutonic, over sixty millions, in Germany, Switzerland, the Netherlands, Great Britain, Denmark, Scandinavia, &c. ; 2, the Græco-Latinic, over seventy-two millions, in Greece, Turkey, Italy, Switzerland, France, Spain, Portugal ; 3, the Slavonian, over seventy-eight millions, in Russia, Poland, Germany, Hungary, Turkey, &c.

Less numerous families are the Celtic (about nine millions, in Ireland, Scotland, and Wales) ; the Lettonian (Lithuania, Livonia, Esthonia, about two millions), the Semitic (two millions and a half, Israelites, and 60,000 Moriscoes, or descendants of the Spanish Moors), the Basques in Spain, and the Gipsies or Zigeuni (300,000).

To the Tartar stock belong the Turks (about two millions), and the Tartars (in Russia).

To the Ural stock belong the Finns (with the Lapps) and the Hungarians or Magyars (about eight millions in all).

In its political division, Europe embraces fifty-five independent states, namely : 1. Three empires : Russia, Austria, and Turkey. 2. Fifteen kingdoms : Portugal, Spain, Belgium, Netherlands, Great Britain and Ireland, Sweden and Norway, Denmark, Prussia, Hanover, Saxony, Bavaria, Würtemberg, Sardinia, the two Sicilies, and Greece. 3. The Papal States. 4. One Electorate : Hesse-Cassel. 5. Seven Grand Duchies : Tuscany, Baden, Oldenburg, Hesse Darmstadt, Mecklenburg-Schwerin, Mecklenburg-Strelitz, Saxe-Weimar. 6. Nine Duchies : Nassau, Brunswick, Anhalt-Bernburg, Anhalt-Dessau, with Köthen, Saxe-Altenburg, Saxe-Coburg-Gotha, Saxe-Meiningen-Hildburghausen, Parma, Modena. 7. Ten Principalities : two Schwartzburg, two Lippe, two Hohenzollern, two Reuss, Waldeck, Liechtenstein. 8. One Landgraviate : Hesse-Homburg. 9. Eight Republics : France, Switzerland, Hamburg, Bremen, Lübeck, Frankfort on the Maine, San Marino, and the Ionian Islands.

To these should properly be added the semi-sovereign states of Servia, Moldavia, Wallachia, the Republic of Andorra in the Pyrenees, &c.

I. PORTUGAL (*Plate 21*).

Portugal extends from 6° 15' to 9° 30' longitude west of Greenwich (8° 9' to 12° longitude east of Ferro, as given in the map), and from

36° 55' to 42° 13' N. Lat. It is bounded on the north and east by Spain, on the south and west by the Atlantic Ocean ; and including the Azores, occupies about 27,552 square geographical miles.

The greater portion of the land forms a highland, with rugged mountains ; the most northern part, however, is an elevated terrace. Some of the individual mountains are : *in the north*, Serra de Suazo, S. de Santa Lucia, S. de Gerez, S. de Cahreira, S. de Marao, S. de Quadrasal, S. de Nogueira ; *in the centre*, S. de Acoba or Caramujo, S. de Estrella (the highest), S. Mansa, S. de Anciao, S. de Moradal, S. Brava, S. de Melrica, S. Aire, S. Albardos, Monte Cantaro, M. Junto, S. Patelo, S. do Minde, S. Montachique, S. de Portalegre, S. de Arrabida ; *in the south*, S. de S. Joao, S. de Ossa, Monte Maro, S. Aboleira, S. de Grandola, the Algarbian boundary mountain, S. de Cadeiro, S. de Monchique, S. de Figueira, M. Figo.

The principal rivers are as follows : 1. The Minho, which forms the northern boundary between Portugal and Spain. 2. The Douro, upon which Oporto is situated. Tributaries on the right, Sabor, Tua, Tamega ; on the left, Coa, Tavoia, Pavia. 3. Tagus or Tejo, the most important stream, with Lisbon situated at its mouth : it is navigable as far as Abrantes. Tributaries on the right, Ponsel, Zezere ; on the left Zatas or Sorraya, Canha. 4. Guadiana, which in its lower part forms portion of the boundary between Spain, navigable to Martola. Rivers along the coast : 5. Lima empties at Viana. 6. Cavado. 7. Bouga. 8. Mondego. 9. Sado.

Southern fruits of various kinds form the principal products, also wine and grain. Sheep are raised in considerable numbers, and the fisheries are important. Mining is almost entirely unknown.

In 1836, the population, excluding Lisbon and the islands, amounted to 3,061,684, divided into 380 Concelhos or congregations, 4034 parishes, and 791,492 families or hearths. The census of 1838 gave 3,224,174 inhabitants in 382 congregations, 3692 parishes, and 827,947 families : that of 1841, 3,412,500 heads, in 386 congregations, 3737 parishes, 847,343 families. The Azores, with the islands of Madeira and Porto Santa, have 330,500 inhabitants in 11 comarcas, 34 congregations, 163 parishes, 76,430 families. This makes 3,743,000 souls for the entire European population. These are mostly of Jewish or Moorish descent, speak a language closely allied to the Spanish, but mixed with many Arabic words, and abounding in nasal sounds. The religion is Roman Catholic.

The kingdom of Portugal is a constitutional monarchy, ruled by princes of the House of Braganza (at present Maria II., born 1819), under the constitution granted in 1826 by Don Pedro. The supreme ruler shares the government with two chambers, which assemble annually, and which consist, the one of members chosen by the crown, the other of members elected by the people.

The state revenue, according to the estimates of 1848-49, amounts to about sixteen millions of dollars. The army embraces 28,100 soldiers, of which only 18,000 are in service. There are 9000 soldiers in the colonies. The navy consists of two ships of the line, six frigates, eight corvettes, eleven brigs, seven schooners, two steam-vessels, &c.

Sub-divisions. I. *Kingdom of Portugal* with six provinces: 1. *Estremadura*, with 780,000 inhabitants, divided into the three circles, Lisbon, Santarem, and Leira. Here is situated the capital city and royal residence, Lisbon or Lisboa, on the right bank of the Tagus, with 260,000 inhabitants. 2. *Lower Beira*, population 330,000. 3. *Upper Beira*, population 290,000; circles, Coimbra, Aveiro, Lamego, Guarda. 4. *Entre Minho e Douro*, population 1,300,000; circles, Porto, Braga, Viana. This province embraces Porto or Oporto on the Douro, the second city in the kingdom, with 70,000 inhabitants. 5. *Traz os Montes*, population 300,000. Circles, Villareal and Braganza. 6. *Alentejo*, population 280,000. Circles, Evora, Baja, Portalegre.

II. *Kingdom of Algarve or Algarbia*, population 130,000. Capital Faro, population 8000.

III. The *Azores*, nine islands in all, with 214,000 inhabitants. 1. San Miguel, population 90,000, capital Delgada. 2. Terceira, population 30,000, capital Angra. 3. Pico, population 25,000, without any town. 4. Fayal, population 25,000, capital Horta. 5. Santa Maria, population 6000. 6. S. Jorge, population 12,000. 7. Graciosa, population 10,000. 8. Flores, population 15,000. 9. Corvo, population 1000.

Portugal owns the following islands, which, however, belong geographically to Africa. 1. *Madeira*, capital Funchal, and 2, *Porto Santo*, the two with 116,000 inhabitants. 3. The ten islands of the *Cape de Verdes*, population 70,000.

The colonies of Portugal are: 1. In Africa, settlements on the west coast (Guinea) with the island Bissago; the islands of St. Thomas and do Principe, with 20,000 inhabitants; the islands of Mozambique on the east coast, and the eleven Admiralty Islands. 2. In Asia: East Indies (coast of Malabar), Goa, the towns of Diu and Damaun; Macao, on the coast of China, population 38,000, and the greater portion of Timor.

2. SPAIN (*Plate 21*)

Spain is situated between the parallels of 36° and $43^{\circ} 46'$ N. lat., and the meridians $3^{\circ} 17'$ east and $9^{\circ} 30'$ west from Greenwich. It is bounded on the north by the Bay of Biscay and France, west by the Atlantic and Portugal, south and east by the Mediterranean and Atlantic. The area amounts to about 183,600 square statute miles.

The interior of Spain is a highland of from 2000 to 3000 feet, traversed by mountains, and separated by one grand range into a southern and northern portion, the plateaus of New and Old Castile. About the highland are districts of less elevation, also surrounded by mountains. A range of mountains, about 360 miles in length, traverses the extreme north of Spain, the boundary between this country and France being formed by a portion of about two hundred miles in length, and known as the Pyrenees. The western continuation of the Pyrenees constitutes the Cantabrian Mountains, to the west of which join on the Asturean. To the north-west, west

of the Minho, we find the mountain terrace of the Parameras. The principal mountain in the interior is the Sierra de Guadarama, separating the Duero from the Tagus, to which are joined on the west, the Sierras de Gredos, de Bajar, and de Gata : to the east, the Sierras de Ayllon, de Solorio, de Cuença, de Molina, and de Albarracin. Between the Tagus and Guadiana are situated the mountains of Toledo, the Sierras de Guadalupe, de San Mamed, &c. The Sierra Morena forms the water-shed between the Guadiana and Guadalquiver, in conjunction with the Sierras de Aroche, de Almaden, de Alcaraz, de Constantina, Sagra, &c. Lastly, in the southern parts of Spain exist the loftiest mountains in the whole country, the Sierra Nevada or the mountains of Granada. Particular portions of the Sierra Nevada are : in the west, Sierras de Ronda, de Malaga, de Almijaras ; in the east, the Alpujarras, the Sierras del Rallo, de Filabres, de Cabrera, de Aljamilla, &c.

Spain possesses six principal rivers, of which five empty into the Atlantic, and one into the Mediterranean. This latter is the Ebro, which rises in the Cantabrian Mountains, is navigable to Tudela, and empties into the sea below Tortosa. Tributaries, Aragon, Xalon, Gallegro, Segre. The Atlantic streams are : 1. The Miño (Portuguese Minho), which, like the last, rises in the Cantabrian Mountains, and in the lower part of its course forms the boundary between Spain and Portugal. 2. The Duero (Portuguese Douro) rises in the Castilian range, and flows through Portugal to the ocean. Tributaries, Pisuerga, Esla, Tormes. 3. The Guadiana comes from the Sierra de Albarracin, and empties into the ocean at Lisbon. Tributaries, Xarama, Alagon. 4. The Guadiana rises in the Sierra d'Alcaraz, has its course partly in Portugal, and is not navigable. Tributary, Giquela. 5. The Guadalquiver rises in the Sierra Sagra, and is navigable to Cordova. Tributaries, Guadalimar and Xenil.

The climate of Spain is as unequal as its elevation above the sea ; rude in Galacia, mild in Valencia and Murcia, and oppressively hot in Andalusia and Granada. The principal exports are wines, raisins, grapes, oranges, figs, almonds, and oil. The usual grains are wheat, rice, Indian corn, and barley. Sheep and horses are raised in large numbers, mules and goats are abundant. The silkworm is much cultivated in the south. The most important metals are silver, mercury, lead, and iron : there are also stone coal, salt, alum, vitriol, saltpetre, marble, and alabaster.

The inhabitants amounted, in 1836, to 12,386,841, at present the number is about 14,000,000. The interior provinces are much less thickly inhabited than the northern. The population is distributed among 16,990 towns, villages, and hamlets, forming 18,871 parishes. The Spaniards are a mixture of aborigines, Romans, Phœnicians, West-Goths, Arabians, Vandals, &c. There are also over 500,000 Basques in the north-east, about 60,000 Moriscoes in the south, and above 40,000 Zigeuni. The principal language is the Spanish, a branch of the Romanic ; of its dialects, the Castilian is used in writing. The Basques have a very peculiar language of their own. Prevailing religion the Roman Catholic.

Form of Government. The kingdom of Spain is ruled by a line of the

House of Bourbon (now Isabella II., born 1830). The constitutional government dates from 1837, although it experienced important modifications in 1844. The Cortes or Chamber of Lawgivers is divided into a Senate and a Congress.

The revenues of the state amounted, in 1848, to 1,257,780,000 reals, or about 62,890,000 dollars.

The army consists of 99,000 troops of the line. The navy, in 1846, embraced three ships of the line, six frigates, five corvettes, six brigs, two brig-gallies, six gallies, six steamships, &c.

Divisions. Since 1833, the monarchy, with the exception of the Canary Islands, has been divided into forty-nine provinces, which, in the following exposition, we shall classify under the arrangement which prevailed prior to 1833. They have most generally names similar to those of their capitals, for which reason the latter are mentioned only when the name is different.

I. *New Castile.* 1. Madrid, pop. 320,000, capital and seat of government of the same name, situated on the Manzanares, pop. 200,000. 2. Toledo, pop. 282,000. 3. Ciudad-Real (formerly la Mancha), pop. 278,000. 4. Cuença, pop. 335,000. 5. Guadalaxara, pop. 159,000.

II. *Old Castile.* 6. Burgos, pop. 224,000. 7. Logroño, pop. 148,000. 8. Santander, pop. 169,000. 9. Avila, pop. 138,000. 10. Segovia, 135,000. Soria, pop. 216,000.

III. *Leon.* 12. Valladolid, pop. 185,000. 13. Palencia, pop. 148,000. 14. Leon, pop. 267,000. 15. Salamanca, pop. 210,000. 16. Zamora, pop. 159,000.

IV. *Asturia.* 17. Oviedo, pop. 435,000.

V. *Galicia,* with 1,472,000 inhabitants. 18. Coruña, pop. 436,000. 19. Lugo, pop. 357,000. 20. Orense, pop. 319,000. 21. Ponte-vedra, pop. 360,000.

VI. *Estremadura.* 22. Badajoz, 306,000. 23. Caceres, pop. 241,000.

VII. *Andalusia.* 24. Cordova, pop. 315,000. 25. Jaen, pop. 267,000. 26. Granada, pop. 371,000. 27. Almeira, pop. 235,000. 28. Malaga, pop. 390,000. 29. Seville, pop. 367,000. 30. Cadiz, pop. 325,000. 31. Huelva, pop. 133,000.

VIII. *Murcia.* 32. Murcia, pop. 284,000. 33. Albacete, pop. 191,000.

IX. *Valencia.* 34. Valencia, pop. 389,000. 35. Alicante, pop. 369,000. 36. Castellon de la Plana, pop. 199,000.

X. *Catalonia.* 37. Barcelona, pop. 442,000. 38. Tarragona, pop. 234,000. 39. Lerida, pop. 151,000. 40. Gerona, pop. 214,000.

XI. *Arragon.* 41. Saragossa, pop. 301,000. 42. Huesca, pop. 215,000. 43. Teruel, pop. 218,000.

XII. *Navarre.* 44. Pamplona, 231,000.

XIII. *Biscay.* 45. Guipuzcoa, pop. 109,000, cap. San Sebastian. 46. Alava, pop. 68,000, cap. Vittoria. 47. Biscaya, pop. 111,000, cap. Bilboa.

XIV. 48. The *Balearic Islands*, with 229,000 inhabitants; Majorca, pop. 150,000, cap. Palma; Minorca, pop. 30,000, cap. Port Mahon; Ivica or Iviza, cap. Ivica; Formentera, &c.

XV. 49. The *Canary Islands*, with 200,000 inhabitants. Only seven out of the twenty islands are inhabited: 1. Canaria, pop. 45,000, cap. Ciudad de las Palmas. 2. Teneriffe, pop. 85,000, cap. Santa Cruz. 3. Fuertaventura, pop. 15,000, cap. St. Maria de Betancuria. 4. Palma, pop. 25,000, cap. Santa Cruz. 5. Lancerota, pop. 16,000, cap. Teguisa. 6. Ferro, pop. 4,000, cap. Valverde, noted as having the first meridian of some nations passing $\frac{1}{2}^{\circ}$ east of it. 7. Gomera, pop. 10,000, cap. S. Sebastian.

The colonies of Spain are: 1. In Africa, the Presidios (Ceuta, pop. 7,000, opposite Gibraltar, Peñon de Velez, Alhucemas, Melilla, and the Zapharine Islands) and the Guinea Islands, together including 17,000 inhabitants. 2. In America, the captain-generalship of Havana, embracing Cuba, Porto Rico, and some of the Virgin Islands, with 1,000,000 inhabitants. 3. In Asia and Australia, the captain-generalship of the Philippines, including part of Luzon or Manilla, pop. 1,800,000: the Bissay, the Babuya, and Basch Islands, part of Magindanao, and the Marian group, all together with 2,700,000 inhabitants.

3. FRANCE (*Plate 22*).

France lies between $42^{\circ} 30'$ and $51^{\circ} 10'$ N. lat., and between $8^{\circ} 20'$ east and $4^{\circ} 40'$ west longitude from Greenwich. Its area is about 205,000 English square miles, or above 130 millions of acres. The greatest length is thus about 595 miles, and the greatest breadth 550. It is bounded on the north-east by Belgium and Germany, to the east by Germany, Switzerland, and Italy, to the south by the Mediterranean Sea and by Spain, and to the west and north-west by the Atlantic Ocean.

To the south and east of France, the surface is high land, the moderately elevated mountains of the interior sloping off towards the north and west: to the north-west and south-west, low lands prevail. The chief mountain systems are the Pyrenees in the south, from which the Black Mountains proceed nearly north; in the east we find the Maritime Alps and the Cottian Alps, with the Jura, the Vosges, and the Ardennes; and in the interior are situated the central mountains of France, including the Cevennes, the Foretz, the mountains of Auvergne, Charolais, &c. The most conspicuous plains are those of the Seine and Loire, the plateaus of Auvergne and Langres, the Landes in the south-west, and the Crau in Provence.

France is exceedingly rich in streams of water, 6000 rivers being enumerated by French geographers, 133 of them navigable. Three large streams, the Loire, Garonne, and Seine, are included entirely within her limits, while the Rhone, Scheldt, the Maas, and the Moselle, are shared with Switzerland, Germany, and Belgium. 1. The Rhone, coming from the Valais, takes up the Saone with the Doubs, the Ain, the Isère, the Drome, the Durance, the Ardèche, and others, finally separating into four arms inclosing a delta, and emptying into the Mediterranean. 2. The Garonne,

rising in the central Pyrenees, has as tributaries, the Arriège, the Tarn, with the Aveyron, the Lot, and the Dordogne. It is navigable to Toulouse, and empties into the Atlantic, having changed its name to the Gironde after its union with the Dordogne. 3. The Loire, rising in the Cevennes, empties into the ocean at Nantes, after receiving the Mayenne, Sarthe, Loiret, Marne, Vienne, Cher, and Allier; it is navigable to Roanne. 4. The Seine rises in Burgundy, on the Côte d'Or, receives the Aube, Marne, Oise with the Aisne, Yonne, and Eure, and empties into the Channel at Havre. 5. The Scheldt rises in Picardy, becomes navigable at Cambray, and flows on into the Netherlands. 6. The Maas, and, 7, the Moselle, rising in the Vosges, water Lothringia; the former flows through the Ardennes at Givet in Champagne, towards the Netherlands; the latter, with the Meurthe and Orne, towards Germany; both empty into, 8, the Rhine. This forms part of the boundary between France and Germany, and receives from Elsass the Ill and the Lauter. Coast streams of the Mediterranean are Var, Herault, Aude; of the Atlantic, Adour, Charente, Sevre, Vilaine, Vire, Orne, and Somme. Besides the rivers, there are seventy canals, measuring over 2000 miles in length.

The climate varies from the heat of Sicily in the south to the rude blasts of Northern Germany in the north, but the greater portion of the country enjoys a mild temperature much like that of Southern Germany.

The products of France are manifold; on the whole, however, much as in central Europe generally. Those more peculiar are wine, olive oil, and silk. The wines of Bordeaux, Burgundy, and Champagne, are celebrated; and the warmer provinces to the north-west prepare large quantities of cider. The olive and silkworm are cultivated in the south, chiefly in Provence. The rearing of sheep, hogs, and bees, is carefully attended to, but the finer varieties of cattle and horses are not much cultivated. The fisheries on the coast yield large revenues.

France is justly celebrated for her industrial products, the entire annual value of which is supposed to amount to about 2000 millions of francs. The ingenuity and skill of the French are especially seen in the manufacture of silks and leathers, jewelry, articles of vertu, watches, &c. The commerce of France is greatly facilitated by the extensive coast, the excellent harbors, navigable rivers, canals, roads, steamboats, and railroads. The exports of France amounted, during 1848, to over 1000 millions of francs, her imports to about 700 millions. The political troubles and convulsions of the last few years have, however, had a very disastrous influence upon her general prosperity.

The population of France, according to the census of 1846, amounted to 33,400,486; it consists of a mixed race of Celts, Romans, Franks, and Burgundians. In Elsass, and in Lothringia, there are from two to three millions of Germans; in Flanders and Hennegau, one and a half millions of Walloons and Flemings; in Brittany a million of Cymri; in Corsica 200,000 Italians; in the Pyrenees 125,000 Basques and 6000 Cagots (a race, like the Cretins, degenerate in mind and body): in addition to these are about 60,000 Jews and 10,000 Zigeuni.

The Roman Catholic religion is predominant throughout the greater part of France, although all forms are represented. Thus there are three millions of Lutherans, one million of the Reformed Church, sixty thousand Jews, four thousand Mennonites, five hundred Quakers, &c. The state of education in France is quite promising, although many portions of the country are sadly deficient in the means of instruction. There are no universities in the German sense of the term, only colleges or faculties for special sciences. All the schools, of whatever grade, are subordinate to the University of Paris.

France has been the oldest monarchy in Europe. As a kingdom, it was ruled in succession by the Frankish kings, the Carolingians, the descendants of Capet (987), the Valois (1328), the Bourbons (1587); it then became a republic in 1792, an empire in 1804, again a kingdom under the Bourbons (1815), since 1830 under the House of Orleans, and since 1848 again a republic. The legislative power is vested in a national assembly of 750 members, chosen by the people; to a president, elected every four years, is assigned the executive. The first (and present) president is Louis Napoleon Bonaparte.

The revenues (for 1849) have been estimated at 1528 millions of francs. The army embraces about 450,000 troops, with about 94,000 horses, and 16,500 pieces of ordnance. The navy consists of a sail and a steam fleet. The former has in active service ten ships of the line, eight frigates, eighteen corvettes, twenty-four brigs, twelve transports, and twenty-four light boats: and in reserve ten ships of the line and fifteen frigates. The steam navy has in active service fourteen frigates, fifteen corvettes, thirty-four avisos; in reserve ten frigates, six corvettes, and six avisos.

The whole of France at present is divided into eighty-six departments, which are subdivided into arrondissements, cantons, and communes. At the head of the departments stand prefects; the arrondissements are governed by sub-prefects, the cantons and communes by maires. The eighty-six departments with their capitals are: 1, Ain (Bourg); 2, Aisne (Laon); 3, Allier (Moulins); 4, Lower Alps (Digne); 5, Upper Alps (Gap); 6, Ardèche (Privas); 7, Ardennes (Mézières); 8, Ariège (Foix); 9, Aube (Troyes); 10, Aude (Carcassonne); 11, Aveyron (Rodez); 12, Calvados (Caen); 13, Cantal (Aurillac); 14, Charente (Angoulême); 15, Lower Charente (La Rochelle); 16, Cher (Bourges); 17, Corrèze (Tulle); 18, Corsica (Ajaccio); 19, Côte d'Or (Dijon); 20, Creuse (Guéret); 21, Dordogne (Périgueux); 22, Doubs (Besançon); 23, Drôme (Valence); 24, Eure (Évreux); 25, Eure-Loire (Chartres); 26, Finistère (Quimper); 27, Gard (Nîmes); 28, Upper Garonne (Toulouse); 29, Gers (Auch); 30, Gironde (Bordeaux); 31, Landes (Mont de Marsan); 32, Hérault (Montpellier); 33, Ille-Villaine (Rennes); 34, Indre (Chateauroux); 35, Indre-Loire (Tours); 36, Isère (Grenoble); 37, Jura (Lons le Saulnier); 38, Canal or Manche (Saint-Lô); 39, Loir-et-Cher (Blois); 40, Loire (Montbrison); 41, Lower Loire (Nantes); 42, Upper Loire (Le-Puy); 43, Loiret (Orléans); 44, Lot (Cahors); 45, Lot-Garonne (Agen); 46, Lozère (Mende); 47, Maine-Loire (Angers); 48, Marne (Chalons-sur-Marne); 49, Upper Marne (Chaumont); 50, Mayenne

(Laval) ; 51, Meurthe (Nancy) ; 52, Maas (Bar-le-Duc) ; 53, Morbihan (Vannes) ; 54, Mosel (Metz) ; 55, Nièvre (Nevers) ; 56, Norden (Lille) ; 57, Côtes du Nord (Saint-Brieuc) ; 58, Oise (Beauvais) ; 59, Orne (Alençon) ; 60, Pas de Calais (Arras) ; 61, Puy-de-Dôme (Clermont-Ferrand) ; 62, Lower Pyrenees (Pau) ; 63, Upper Pyrenees (Tarbes) ; 64, East Pyrenees (Perpignan) ; 65, Lower Rhine (Strasburg) ; 66, Upper Rhine (Colmar) ; 67, Rhone (Lyon) ; 68, Mouths of the Rhone (Marseilles) ; 69, Upper Saône (Vesoul) ; 70, Saône-Loire (Macôn) ; 71, Sarthe (Le Mans) ; 72, Seine (Paris) ; 73, Lower Seine (Rouen) ; 74, Seine-Marne (Melun) ; 75, Seine-Oise (Versailles) ; 76, Deux Sèvres (Niort) ; 77, Somme (Amiens) ; 78, Tarn (Alby) ; 79, Tarn-Garonne (Montauban) ; 80, Var (Draguignan) ; 81, Vaucluse (Avignon) ; 82, Vendée (Bourbon-Vendée) ; 83, Vienne (Poitiers) ; 84, Upper Vienne (Limoges) ; 85, Vosges (Epinal) ; 86, Yonne (Auxerre).

Foreign possessions of France. 1. In Asia: Pondicherry, Carical, Mahé, Chandernagore, and Yanoon in the East Indies, with 168,000 inhabitants. 2. In Africa: settlements in Senegal, with the islands St. Louis and Gorée, with 20,000 inhabitants; island of Bourbon or Reunion, with 107,000 inhabitants; St. Maria de Madagascar, population 5000; Algiers, with a European population of 113,000 in 1847. 3. In America: of the Lesser Antilles, Martinique, Guadeloupe, Maria Galante, Desirade, and the Saints' group, altogether with 256,000 inhabitants. In South America: a part of Guiana, with the island of Cayenne, pop. 36,000. In North America: the islands St. Pierre and Miquelon in Newfoundland, pop. 1500. 4. In Australia: the Marquesas Islands, pop. 20,000. The extra-European dominions of France may be estimated at above 90,000 square geographical miles.

4. SWITZERLAND (*Plate 18*).

Switzerland is bounded by France, Germany, and Italy, which inclose it on all sides; France on the west, Germany on the north and east, the Italian states, Milan, Piedmont, and Savoy on the south. It is situated nearly between 46° and 48° N. lat., and 6° and $10^{\circ} 30'$ of longitude east of Greenwich. It is about 200 miles long, 140 broad, and comprises an area of 15,000 square statute miles.

The surface of Switzerland consists almost entirely of mountains and lakes. The Alpine chains are separated by deep valleys and narrow plains, which form the beds of large rivers, or the basins of extensive lakes. The mountain system of Switzerland may be reduced to those of the Alps and the Jura, with the intermediate high lands. The St. Gothard forms the centre of the Alps, and from this radiate five main chains: 1. The Lepontine Alps to Monte-Rosa (15,210 feet high), and the Pennine Alps from this to the Great St. Bernard. 2. The Bernese Alps from the Grimsel to the Jorat in the Canton Vaud (highest peaks, the Jungfrau, 13,672, the Finsteraarhorn, 14,026). 3. Lepontine-Rhætian Alps in the Grisons and in Valais (Vogelsberg, Bernhardin, Splügen, &c). 4. The Alps running to the north-east in East Uri, Glarus, St. Gallen, Appenzell, Schwyz. 5. The Unter-

walden Alps extending towards the north. The Jura Mountain, in the north-west, is of greatest elevation in Mont Tendre and Dole. The plateau of the Aar is almost everywhere at least 1200 feet high.

Rivers. 1. The Rhone pours out of the glacier of the Rhone at the foot of the Furca, flows through the Lake of Geneva, forms for a time the boundary between Savoy and France, and finally enters the latter country. 2. The Rhine rises in the Grisons, by the union of the Lower and Middle Rhine, to which subsequently joins the Upper Rhine; it then flows through Lake Constance, and ultimately leaves Switzerland at Basel. Tributaries: on the right, the Inn; on the left, Thur, Aar (with Emme, Reuss, Limmat, Saane, Zihl), and Birs. 3. The Inn, a tributary of the Danube, comes from a lake on the Maloja Mountain, and leaves Switzerland at Finstermünz. 4. The Tessin, a tributary of the Po, comes from the St. Gotthard. Among the numerous lakes, the largest are: Geneva or Lemman, area 176 square geographical miles, Constance 144 do., Lakes Neufchatel, Zurich, Vierwaldstätt or Luzerne, Brienne, Wallenstätt, and Zug.

The climate of Switzerland is milder on the plains than in most parts of Germany, although becoming more and more severe with increasing elevation of the land; an eternal winter reigns on the summits of the Alps. The dairy yields better than the ploughed field, and grain is not produced in sufficient quantity to supply the wants of the inhabitants. The most important products of Switzerland are flax, hemp, tobacco, medicinal plants, zinc, cobalt, iron, marble, clay, lime, gypsum, slate, stone coal, and peat. Silver, copper, and lead, are only obtained in small quantities.

The population of Switzerland is mostly of the German stock: they speak dialects of the German language, excepting the Italians in the south (about 120,000), and the French in six cantons of the west (about 450,000). The Romanic language is spoken in part of the Grisons. The census of 1837 gave 2,190,258 inhabitants (among them 54,767 foreigners). There are about 1,200,000 Protestants and 800,000 Roman Catholics, together with 800 Jews (in two villages) and 900 Anabaptists (in Bern). The Roman Catholic cantons are Luzerne, Uri, Schwyz, Unterwalden, part of Appenzell, Tessin, and Valais; the rest are mixed Catholic and Protestant.

Politically, Switzerland, or the Swiss alliance, is a confederacy formed by twenty-three minor free states or sovereign cantons, which became united into one, September 12th, 1848. According to the new arrangement, the supreme power is vested in a diet consisting of two sections: one, the Nationalrath (one member to every 20,000 souls of the entire population, now a hundred and eleven in all) and the Ständerath (forty-six deputies of the cantons, two from each). The supreme executive power is a court of seven members, elected by the diet for three years.

The *army* amounted, in 1841, to 64,019 soldiers. Each canton is obliged to furnish three men to every 100 souls of the Swiss population.

Divisions. The Swiss cantons are as follows: 1. Zurich, 953 square (English statute) miles, population 237,480, capital of the same name on the Limmat and Lake Zurich, with 14,300 inhabitants. 2. Bern, 3665 square miles, pop. 411,470, cap. of same name on the Aar, pop. 22,500. 3.

Luzerne, 762 square miles, pop. 129,500, cap. Luzerne on the Reuss and Lake Luzerne, pop. 8500. 4. Uri, 508 square miles, pop. 13,870, cap. Altorf, 1500 inhabitants. 5. Schwyz, 466 square miles, pop. 42,810, cap. Schwyz on the Mythenberg, pop. 5200. 6. Unterwalden, 258 square miles, pop. 23,470. 7. Glarus, 460 square miles, pop. 30,270, chief town Glarus, pop. 4100. 8. Zug, 116 square miles, pop. 15,940, cap. Zug. 9. Freiburg, 487 square miles, pop. 94,320, cap. Freiburg, pop. 9100. 10. Solothurn or Soleure, 487 square miles, pop. 65,660, cap. do. on the Aar, pop. 4600. 11. Basel (Stadt), pop. 25,300, chief town Basel on the Rhine, pop. 20,500. 12. Basel (Landschaft), pop. 42,750, cap. Liestal, pop. 2600. 13. Schaffhausen, 169 square miles, pop. 31,990, cap. do. on the Rhine, pop. 6000. 14. Appenzell, 222 square miles, pop. 54,480. 15. St. Gall, 847 square miles, pop. 165,190, capital of same name, pop. 9500. 16. Grisons, 2966 square miles, pop. 90,280, cap. Chur on the Plessur, with 5500 inhabitants. 17. Aargau 762 square miles, pop. 190,060, cap. Aarau on the Aar, pop. 4800. 18. Thurgau, 349 square miles, pop. 87,490, cap. Frauenfeld, pop. 1200. 19. Tessin (Italian Switzerland), 1133 square miles, pop. 111,180, chief towns Locarno, Lugano, and Bellinzona. 20. Vaud, 1483 square miles, pop. 189,310, cap. Lausanne, with 15,000 inhabitants. 21. Valais, 1949 square miles, pop. 77,310, cap. Sitten on the Rhone. 22. Neuchâtel, 296 square miles, pop. 60,500, cap. Neuchâtel, with 6400 inhabitants. 23. Geneva, 95 square miles, pop. 59,840, cap. Geneva on the Rhone and Lake Geneva, with 28,000 inhabitants.

5. BELGIUM (*Plates 15, 16*).

Belgium lies between $2^{\circ} 29'$ and $5^{\circ} 54'$ longitude east of Greenwich, and between $49^{\circ} 30'$ and $51^{\circ} 30'$ of N. latitude. It borders on the Netherlands in the east: on the Netherlands and Germany (Prussia) in the south-west; on the North Sea in the north-west.

Mountains are only found in the southern parts (the provinces Namur, Lüttich, and Luxemburg), which is traversed by the Ardennes; the greater portion of the country is entirely level. The plain of Campine, between the Scheldt and the Mosel, is especially worthy of attention.

Rivers. 1. The Scheldt comes from France, and enters Belgium as a stream, navigable below Condé, emptying into the North Sea, in the Dutch province of Seeland. Tributaries are Dender and Rupel on the right (the latter formed by the Nethe and Dyle), and Lys on the left. 2. The Maas likewise comes from France, receives the Ourthe on the right and the Sambre on the left, forms for a considerable time the boundary between the Belgian and the Netherland Limburg, and then passes into the latter. The western provinces possess numerous canals.

Agriculture is prosecuted with the greatest care. The products of the land are grain, leguminous seeds, vegetable oils, hemp, flax, hops, fruits, madder, &c.; of the mineral kingdom, stone coal (from more than 250 mines), iron (about 120 blast furnaces), copper, lead, zinc, marble, &c.

Mineral springs are in abundance, and the raising of cattle, horses, and sheep, is prosecuted extensively.

According to the census of 1846, Belgium had 4,335,319 inhabitants, distributed in 86 towns and 2431 communes. This would indicate an exceedingly dense population to the square mile. The people of Belgium are (in the west) partly Flemings (allied to the Hollanders) and (in the south) partly Walloons (allied to the French). The French is the language most generally used; although next to it, the Flemish is much employed. The great majority of the population is Roman Catholic, there being only 16,000 Protestants and 30,000 Jews. The manufactured products are cloth, linen, carpets, tapestry, hats, silk, arms, and machines. The state of public education is not at all elevated. There are four universities, of which those in Ghent and Lüttich are supported by the state, those in Brussels and Lowen by private contribution. The arts of painting and sculpture are much cultivated.

The form of government is a hereditary constitutional monarchy. King Leopold I., of the House of Saxe-Coburg (since 21st July, 1831) is the present ruler, according to the constitution of Feb. 25, 1831. The king shares the lawgiving power with two chambers, the senate and chamber of representatives, both elective. The revenues of the state amounted, in 1848, to 117,612,250 francs. The army consists of about 90,000 soldiers (sixty-five battalions of infantry, thirty-eight of cavalry, &c).

Belgium is divided into nine provinces. 1. Antwerp, pop. 406,000, cap. Antwerp on the Scheldt, with 85,000 inhabitants. 2. South Brabant, pop. 690,000, cap. Brussels on the Senne, with 113,000 inhabitants. 3. West Flanders, pop. 613,000, cap. Bruges, with 49,000 inhabitants. 4. East Flanders, pop. 792,000, cap. Ghent on the Scheldt, and Lys, with 105,000 inhabitants. 5. Hennegau (Hainault), pop. 716,000, cap. Mons or Bergen, with 23,000 inhabitants. 6. Lüttich (Liege), pop. 453,000, cap. of same name on the Maas, with 72,000 inhabitants. 7. Limburg (Belgian portion), pop. 186,000, cap. Hasselt on the Demer, with 8700 inhabitants. 8. Luxemburg (Belgian portion), pop. 186,000, cap. Arlon, with 5000 inhabitants. 9. Namur, pop. 263,000, cap. Namur on the Maas and Sambre, with 23,000 inhabitants.

6. NETHERLANDS (*Plates 15, 16*).

This country lies between the meridians of $3^{\circ} 14'$ and $7^{\circ} 04'$ east of Greenwich, and between the parallels of $50^{\circ} 50'$ and $53^{\circ} 30'$ N. lat. It is bounded on the north and west by the North Sea, on the east by Germany (Hanover and Prussia), and on the south by Belgium. Luxemburg is entirely separated from the other provinces, between Belgium, Germany, and France, and is embraced within the parallels of $49^{\circ} 25'$ and $50^{\circ} 10'$ N. lat.

There are no mountains in the Netherlands, excepting a range from the Ardennes through the province of Luxemburg: in Utrecht there are some

lines of hills. Her rivers, however, are on an extensive scale. 1. The Rhine, soon after entering from Germany, divides into two arms, the southern taking the name of the Waal, the more feeble northern one retaining the original name. At Gorkum the Waal becomes united to the Maas, and empties into the North Sea by two principal arms. The new Yssel leaves the Rhine not far from Arnheim, and at Campen empties into the Zuyder Zee; further on, at Wyk, a new division takes place. The left main arm, called the Leck, takes up the Merwe, an arm of the Maas, and passes into the North Sea under the name of the Maas; the right arm flows on as the crooked Rhine past Utrecht (where it sends off the Vecht into the Zuyder Zee) to Leyden, and then empties into the North Sea at Katwyk. 2. The Maas enters the Netherlands from Belgium, takes up the Roer from the right, and empties into the Waal at Gorkum. 3. The Scheldt likewise comes from Belgium, and flows into the North Sea by two arms, which inosculate by small branches forming islands. In addition to the above, the Vecht empties into the Zuyder Zee, and the Hunse (both from Germany) into the Lauwer Zee. In addition to her numerous navigable rivers, the Netherlands exhibits a plexus of canals, far exceeding that possessed by any other country.

The climate of the Netherlands is very variable, although the extremes of heat and cold are not so widely separated as in Germany. The principal products are horned cattle, horses, fish, oysters, grain, flax, hemp, rape-seed, madder, tobacco, opium, &c. The minerals are clay, salt, and peat; there are no mineral springs.

The population of the Netherlands amounted, on the 1st of January, 1848, to 3,236,741 souls, mostly of German descent; to the north of the Maas it consists of Hollanders and Frieslanders, south of this river, of Flemings. Most of the people are of Protestant persuasions; in 1841 (excluding Luxemburg), there were 1,700,000 Protestants, 1,100,000 Roman Catholics, 52,000 Jews, and 3300 Sectarians. The inhabitants are much given to the pursuit of commerce, although not on so extensive a scale as formerly. In respect to advancement in sciences, the nation is behind the Germans, although there are not wanting excellent seminaries of instruction (among them three universities, at Leyden, Utrecht, and Gröningen); there are also rich collections of all kinds.

The kingdom of the Netherlands is a constitutional monarchy; the ruling dynasty is the Orange line of the House of Nassau. Since March 17, 1849, the king has been William III., born 1817. The present constitution dates from 11th October, 1848; according to this, the legislative branch of government consists of two chambers. The first chamber embraces thirty-nine members, chosen by the nobility for nine years; the second is elected for four years directly by the people, according to a certain ratio.

The revenues, in 1849, amounted to 71,692,316 florins, or to 28,676,926 dollars.

The army consists of nine regiments of infantry, five regiments and two squadrons of cavalry, four regiments of artillery, one battalion of engineers, sappers, and miners, and one pontoon corps. The navy, on January 1st,

1849 (including vessels on the stocks) amounted to seven ships of the line, sixteen frigates, two razee frigates, fifty-seven smaller vessels, seventeen steamboats, three transports, and seventy-four gun-boats.

Divisions. 1. North Holland, pop. 463,000, cap. Amsterdam on the Amstel and the Gulf of Y, with 211,000 inhabitants. 2. Guelderland, pop. 873,000, cap. Arnhem on the Rhine, with 15,000 inhabitants. 3. South Holland, pop. 564,000, cap. the Hague or Gravenhage, the royal residence, with 19,000 inhabitants. 4. North Brabant, pop. 404,000, cap. Herzogenbusch, with 19,000 inhabitants. 5. Zealand, consisting of over twelve islands in the mouth of the Scheldt (of which Walcheren, Schouwen, and Tholen are the largest), pop. 158,000, cap. Middelburg, with 14,000 inhabitants. 6. Utrecht, pop. 153,000, cap. Utrecht on the crooked Rhine, with 245,000 inhabitants. 7. Friesland, pop. 247,000, cap. Leeuwarden, with 21,000 inhabitants. 8. Overijssel, pop. 212,000, cap. Zwolle on the Aa, with 16,000 inhabitants. 9. Gröningen, pop. 190,000, cap. do. on the Hunse and Aa, with 31,000 inhabitants. 10. Drenthe, pop. 84,000, cap. Assen. 11. Duchy Limburg, pop. 203,000, a part of the German alliance, cap. Maestricht on the Maas, with 30,000 inhabitants. 12. Grand Duchy of Luxemburg, pop. 186,000, likewise a member of the German alliance, with a special constitution from July 9th, 1848, cap. Luxemburg on the Elz, with 12,000 inhabitants.

Colonies of the Netherlands. 1. In Asia: large possessions in Java, including the greater part of the island; Sumatra (S.E., West and N.W. coast); Borneo (on the W. and S. coast) and Celebes; the Amboynas, with 62,000 inhabitants, and the ten Banda Islands, with 44,000 inhabitants; the islands of Bintang, Banca, Billiton, Madura, Salayer, a part of Ternate, &c. 2. In Africa: some settlements and forts on the coast of Guinea (gold coast). 3. In America: a part of Guiana, or Surinam; of the Antilles, Curaçao, and St. Eustache, together with the smaller islands, Martin, Aruba, Aves, and Bonaire.

7. ENGLAND (*Plate 20*).

This powerful kingdom, exclusive of the smaller islands, is situated between 50° and 59° N. lat., and 2° E. and 10° W. longitude from Greenwich. Geographically, it is divided into Great Britain and Ireland, the former being again divided into England proper (including Wales), with 57,960 square statute miles, and Scotland with 30,500. England is entirely surrounded by the Atlantic Ocean: that portion of the Atlantic lying between Great Britain and Ireland is called the Irish Sea (to the North the North Channel, and to the south St. George's Channel).

The mountains of England do not attain to any very great elevation. In the south-west of Great Britain are the mountains of Cornwall, rich in tin, these ending in the promontories of Land's End and Lizard Point. North of these is the high land of Wales, with Snowden (3557 feet) for the loftiest summit. In the north, a range known as the Cheviot and Pentland Hills

separates England from Scotland. Scotland is a land of hill and mountain ; the Grampians constitute her most extensive range, situated north of the Clyde and Forth. Ben Nevis, the highest point, has an elevation of 4380 feet. Ireland is an extensive plain, with a few isolated hills : the highest is Curran Tual in Kerry, 3412 feet.

The principal rivers of England are, on the east side : the Thames, the Southern Ouse, the Humber (formed by the junction of the Trent and the Northern Ouse), the Tyne, and the Tweed ; on the west coast, the Severn, the Dee, the Mersey, Eden, and Esk. In Scotland, the Forth, Tay, and Dee on the east, and the Clyde on the west. The principal river of Ireland is the Shannon, which connects numerous lakes, and forms a large bay. The canals of England are important means of internal communication. Some of these pass over rivers, roads, and other canals, while others penetrate mountains by tunnels. The most important are, in England : the Grand Trunk, the Liverpool and Leeds, the Oxford, the Grand Junction, and the Bridgewater between Manchester and Liverpool ; in Scotland, the Caledonian ship canal ; and in Ireland, the Grand Canal. Of the numerous lakes, the largest in England is Windermere ; in Scotland, Loch Lomond ; and in Ireland, Loch Neagh.

From its proximity to the sea, the climate of England is much damper and more moderate than that of Central Europe : the freezing of the Thames rarely takes place. Owing to the abundance of moisture produced by the condensation of the Gulf Stream vapors, the atmosphere is very frequently filled with fogs. With a large extent of fertile soil, there are extensive tracts of barren moor and heath, especially in Scotland and Ireland.

In the amount and excellence of her products, both natural and manufactured, England surpasses all the rest of Europe. The most important of the former are salt, alum, vitriol, coal, iron, lead, tin, zinc, copper, cobalt, calamine, arsenic, marble, alabaster, clay, pipe clay, sulphur, slate, chalk, and peat ; grain, potatoes, hops, madder, saffron, apples and pears, flax, hemp, liquorice ; cattle, sheep, dogs, horses, goats, pigs, fish (especially herring and salmon), oysters, &c. Owing to the scarcity of forests, there are few wild animals, excepting hares and rabbits.

The population of Great Britain and Ireland, according to the last census (1841), amounted to nearly twenty-seven millions, in addition to which, there were 150,000 in the other European possessions. Both England and Ireland belong to the most populous countries of Europe. The inhabitants are mostly a mixed race of Celtic, German, and Roman descent. The English language proper exhibits traces of many others, but is essentially derived from the ancient Saxon. The people of Wales retain much of the old British or Cymrian language in their dialect ; the Highlanders of Scotland and a portion of the Irish, the allied Gaelic or Erse. The language of the Shetland Islands is a dialect of the Norwegian, that of the Norman Islands of French : it is German in Helgoland, Italian in Malta, and Spanish in Gibraltar. As to the form of religion, the majority of the inhabitants of England proper belong to the Established Church, those of Scotland to the Presbyterian, and of Ireland to the Roman Catholic ; there

are numerous Methodists, Independents, Herrnhuters, Lutherans, Quakers, and also other dissenters. The entire kingdom, in 1835, contained fourteen millions of Episcopalians, two millions and a half of Presbyterians, half a million of Methodists, seven millions of Catholics. The number of Jews has been variously estimated from 15,000 to 27,000.

The productive industry of England far exceeds that of any other nation on earth. Her principal manufactures consist of woollen, silk, and cotton goods, linens, stone ware, porcelain, metal wares and machinery of all kinds, watches, paper, leather, beer, soap, hats, glass, &c. England's commerce extends to every sea, and corresponds in importance to her productive industry. The three united kingdoms possess not less than 24,000 merchant vessels (among them over 1100 steamboats) amounting to a tonnage of twelve millions. The exports, in 1846, reached over fifty-one millions of pounds sterling. The sciences and arts are liberally patronized, and the means of education are abundant and widely diffused, although very much still remains to be done in the cause of popular education. The principal seminaries of learning are the universities of Oxford, Cambridge, and London in England, those of Glasgow, Aberdeen, and Saint Andrew's in Scotland, and that of Dublin in Ireland; these have been mainly founded, endowed, and supported by private means, comparatively little help being derived from the state.

The former three kingdoms of England, Scotland, and Ireland, are now included in one, of which Victoria I. (born 1819) has been queen since 1837. The legislative branch of government consists of a parliament composed of two houses, an upper and a lower. The members of the upper house are the royal princes, two archbishops, twenty-four bishops, and the peers or lords nominated by the crown, and whose privileges, after their decease, descend to their eldest sons. The House of Commons, or members of the lower house, are elected for seven years by such of the people as are entitled to vote either by a property qualification, or by the possession of certain municipal privileges. The entire number of members consists of 658, of which 477 are from England, 23 from Wales, 53 from Scotland, and 105 from Ireland.

The public revenues amount annually to over fifty millions sterling, of which more than half is applied to paying the interest of the state debt, which exceeds 800 millions sterling.

The army amounted, in 1848, to about 150,000 men, among them 12,300 cavalry, 12,400 artillery, and 6600 guards; in the East Indies were stationed about 31,000, in the West Indies 3400, in the remaining colonies 5900. The navy included over 600 vessels of war; among them 100 ships of the line, the same number of frigates, 125 steam vessels, &c. Its armament amounted to about 34,000 sailors and 10,000 marines; the number of guns carried, about 17,000.

Divisions. The principal portions of the kingdom in Europe are the kingdoms of England, Scotland, and Ireland, each of which is divided into counties or shires.

A. THE KINGDOM OF ENGLAND EMBRACES : I. England proper, area

50,903 square statute miles, and population 14,995,000, which has, from time immemorial, been divided into forty counties or shires, as follows: 1, Bedford; 2, Berks (chief town, Reading); 3, Buckingham; 4, Cambridge; 5, Chester; 6, Cornwall; 7, Cumberland (Carlisle); 8, Derby; 9, Devon (Plymouth); 10, Dorset; 11, Durham; 12, Essex; 13, Gloucester; 14, Hampshire; 15, Hereford; 16, Hertford; 17, Huntingdon; 18, Kent; 19, Lancashire (Manchester, Liverpool); 20, Leicester; 21, Lincoln; 22, Middlesex (part of London); 23, Monmouth; 24, Norfolk; 25, Northampton; 26, Northumberland; 27, Nottingham; 28, Oxford (Oxford); 29, Rutland; 30, Shropshire; 31, Somerset; 32, Stafford; 33, Suffolk; 34, Surrey; 35, Sussex; 36, Warwick (Birmingham); 37, Westmoreland; 38, Wilts; 39, Worcester; 40, York.

II. The *Principality of Wales*, with the island of Anglesea (formerly connected with the mainland by a chain bridge, but recently by the celebrated Britannia Tubular Bridge), has an area of 7425 square statute miles, with 912,000 inhabitants; it is divided into twelve counties: 1, Anglesea; 2, Caernarvon; 3, Denbigh; 4, Flint; 5, Merioneth; 6, Montgomery; 7, Brecknock; 8, Cardigan; 9, Caermarthen; 10, Glamorgan; 11, Pembroke; 12, Radnor.

B. THE KINGDOM OF SCOTLAND possesses an area of 32,164 square statute miles, with 2,620,000 inhabitants. Geographically, it may be divided into three parts, North Scotland or the Highlands, South Scotland or the Lowlands, and Middle Scotland or the Islands; politically into thirty-one counties and two stewartries.

These are: 1, Aberdeen; 2, Argyle; 3, Ayr; 4, Banff; 5, Berwick; 6, Bute; 7, Caithness; 8, Clackmannan; 9, Dumbarton; 10, Dumfries; 11, Edinburgh; 12, Elgin; 13, Fife; 14, Forfar; 15, Haddington; 16, Inverness; 17, Kincardine; 18, Kinross; 19, Kirkeudbright; 20, Lanark; 21, Linlithgow; 22, Nairn; 23, Orkney and Shetland; 24, Peebles; 25, Perth; 26, Renfrew; 27, Ross and Cromarty; 28, Roxburgh; 29, Selkirk; 30, Stirling; 31, Sutherland; 32, Wigton. Of the Orkney and Shetland Islands, twenty-six of the sixty-seven belonging to the former are inhabited, and thirty of the eighty-six belonging to the latter.

C. THE KINGDOM OF IRELAND contains an area of 32,035 square miles, and is divided popularly into four provinces; politically into thirty-two counties.

I. *Leinster*. Counties: 1, Dublin, capital Dublin, with over 300,000 inhabitants; 2, Wicklow; 3, Wexford; 4, Kilkenny; 5, Carlow; 6, Queen's; 7, King's; 8, Kildare; 9, Westmeath; 10, Eastmeath; 11, Louth; 12, Longford.

II. *Ulster* in the north, with the counties: 13, Cavan; 14, Monaghan; 15, Armagh; 16, Down; 17, Antrim; 18, Londonderry; 19, Donegal; 20, Tyrone; 21, Fermanagh.

III. *Connaught* in the west, with the counties: 22, Leitrim; 23, Sligo; 24, Mayo; 25, Roscommon; 26, Galway.

IV. *Munster* in the south, with the counties: 27, Tipperary; 28, Waterford; 29, Cork; 30, Kerry; 31, Limerick; 32, Clare.

The European appendages of the United Kingdom are: 1. The Isle of Man, in the channel between England and Ireland (chief town, Castletown). 2. The Norman Islands of Jersey, Guernsey, Alderney, and Sark, not far from the coast of France, pop. 60,000. 3. The island Helgoland, in the North Sea, pop. 2300. 4. The Fortress of Gibraltar, in Spain, on the Straits of Gibraltar. 5. The islands Malta, Gozzo, and Comino (see under Italy).

The foreign or extra-European possessions of England are of vast extent, and are situated in all parts of the world. 1. In Asia: the island of Ceylon, with 1,442,000 inhabitants; the Chinese island of Hong-Kong; the island of Labuan; the possessions of the East India Company, of which the Punjaub contains over one hundred millions of inhabitants; together with the states under protection of the Company containing thirty millions. 2. In Africa: the Cape of Good Hope or the Cape Colony; the islands of Mauritius, St. Helena, Ascension, and the Seychelles. Many possessions on the west coast, as Sierra Leone, Gambia, &c. 3. In America: *a.* Canada, New Brunswick, Nova Scotia, Cape Breton, Prince Edward's Island, all together with about 1,600,000 inhabitants. *b.* The northern territories on Hudson's Bay, the Arctic Ocean, the Pacific, &c. *c.* Guiana. *d.* Honduras. *e.* The West India Islands of Jamaica, Trinidad, Dominica, with the Bahamas. 4. In Australia, various immense territories, South and West Australia, New South Wales, Van Dieman's Land, as also the Falkland and New Zealand Islands.

8. DENMARK (*Plate 19*).

Denmark, including Schleswig and the Duchy of Holstein, belonging to the German alliance, but without reckoning Iceland and the Faroes, extends from $53^{\circ} 20'$ to $57^{\circ} 44\frac{1}{2}'$ N. lat., and from 8° to 10° of longitude east of Greenwich. The total area is about 22,000 miles, the greatest length about 280 miles, and greatest breadth 120. Denmark is bounded on the south by Germany (Hanover, Hamburg, Mecklenburg Schwerin, Lübeck, and Oldenburg); in all other directions, by the sea, the North Sea being to the west, the Skagerrack to the north, the Cattogat and Baltic to the east.

There is nothing to be said with respect to any mountains and large rivers of Denmark; in their stead we find numerous bays and straits. The Cattogat is connected with the North Sea by three straits: the Sund, the Great Belt, and the Little Belt. The principal river of the peninsula of Jutland is Guden, flowing towards the north-east; the remaining rivers are of slight importance, and flow towards the west. The elevated ridge in the centre of Jutland in no place exceeds the height of five hundred feet above the sea. The climate of Denmark is mild, the winters being much less intense than those of Germany. The islands, with the Duchies of Schleswig and Holstein, are quite fertile; and agriculture, the rearing of cattle, and the fisheries, are of much importance. The principal products are horses, cattle, hogs, wild fowl, fish, oysters, lobsters, bees; grain, rape

seed, buck-wheat, flax, hops, fruits, peat, lime, tar, stone coal, salt, vitriol, amber. Excepting lime and peat, there is no mineral of importance ; no metals of any kind are found in Denmark.

The inhabitants in the kingdom and in the Duchies amounted, in 1845, to 2,239,077 souls, of which 1,400,000 were Danes, and 40,000 Frieslanders ; the rest, about one third, were Germans. Excepting 2000 Reformers, and 6000 Jews, all the inhabitants are Lutherans, under eight bishops, and one general superintendent : the Lutheran is the established church. The manufactured products are lace, leather gloves, woollen and linen goods, rape-seed oil, sugar, &c. ; the amount, however, is not very great. Owing to the peculiarly favorable position of the country, navigation and commerce are carried on extensively. The cause of education is well attended to by the universities in Copenhagen and Kiel, and by many Gymnasia and good public schools.

Denmark is a constitutional monarchy, governed under the fundamental laws of June 5, 1849 (at present by Frederick VII., born 1808). The Reichstag, which must be assembled annually in October, consists of two chambers. The members of the first chamber are elected for three years by universal and direct suffrage : one member to 14,000 inhabitants. The members of the second chamber, half as many in number as those of the first, are chosen for eight years, indirectly : among other requirements, they must be forty years of age. This form of government does not apply to Holstein, and even Schleswig is scarcely subject to it.

The revenues for 1848 amounted to 16,709,000 rigsbank dollars, or to 8,354,500 dollars of American currency. The military force embraces 25,000 men for the peace establishment, 75,000 in the war. The navy consists of six ships of the line (of which only one is equipped), seven frigates, five corvettes, four brigs, three schooners, &c. The whole state is divided politically into bailiwicks, ecclesiastically into eight chapters. The kingdom of Denmark, in its more restricted sense, consists of the peninsula of Jutland, with the four chapters of Aalborg, Wiborg, Aarhus, and Ripen (pop. 577,000), with numerous islands. The most important of the latter are : 1, Zealand, pop. 475,000, containing the capital city and royal residence, Copenhagen, with 127,000 inhabitants ; 2, Funen, pop. 166,000 ; 3, Laaland, pop. 53,000 ; 4, Bornholm, pop. 26,500 ; 5, Falster, pop. 22,000 ; 6, Langeland, pop. 17,000.

The appendages to Denmark proper are : 1. The Faroer, twenty-five in number, of which only seventeen are inhabited (pop. 7300). The largest of these is called Stromøe. 2. Iceland, pop. 56,000, cap. Reikiavik. 3. The Duchy of Schleswig, with 363,000 inhabitants, cap. Schleswig. Here also belong the islands Alsen, Arrøe, Sylt, Föhr, Tehmern. 4. The Duchy of Holstein, pop. 479,000, cap. Glückstadt. 5. The Duchy of Lauenburg, pop. 45,000, cap. Ratzeburg.

The colonies or foreign possessions of Denmark are : 1, in Asia, the Nicobar Islands ; 2, in Africa, the Forts Christiansborg, Fredensborg, &c., in Upper Guinea ; 3, in America, Greenland, and the West India Islands of St. Thomas, St. Croix, and St. John.

9. SWEDEN AND NORWAY (*Plate 19*).

The kingdoms of Sweden and Norway now united under one ruler, constitute the peninsula of Scandinavia; this extends from $55^{\circ} 21'$ to 71° N. lat., and from 1° to 35° E. longitude from Greenwich. Its greatest length is 1550 statute miles, its greatest breadth 350. The area included is 292,700 square English miles, of which 170,150 are in Sweden. It is joined by Russia on the north-east, but is surrounded on all other sides by the ocean (to the east by the Gulf of Bothnia and the Baltic, to the south by the Baltic, the Sound, the Cattegat, and the Skagerrack, to the west by the North Sea, and to the north by the Arctic Ocean).

The most important mountain is the Kjölen or Dofrines which for a long distance constitutes the barrier between what were once the hostile states of Norway and Sweden. The highest point is the Schneehattan (8120 feet), next to which comes Skagtöltend, 8101. The western part of the peninsula is high land; in the south formed by the so called Fjelde or fields, barren elevated plains, among which Dovrefjeld and Langfjeld are the most conspicuous. Towards the south, the high land runs off into the great plain of Gothland. In addition to numerous fiordes (bays or arms of the sea), the peninsula is well supplied with inland waters, both lakes and rivers. The most important river in Norway is the Glommen, with its tributaries; next to this the Tanaelf, the boundary between Norway and Russia, and emptying into the Arctic Ocean. Among the numberless rivers (elfs) of Sweden may be mentioned Tornaelf, the line of separation from Russia, Calixelf, Lubeaelf, Piteaelf, Skellefteaelf, Ulmeaelf, Angermanelf, Indalself, Dalelf, all emptying into the Gulf of Bothnia. Among the lakes are, in Norway, the Mjösen and the Fämund; in Sweden, the Mälär, communicating with the sea, the Hjelmar, the Wener, and the Wetter. The latter is connected by the Motala River, as well as by several canals and lakes, with the Baltic, and by canals and lakes with Lake Wener; this again is brought into communication with the Cattegat by the Götaelf and the gigantic Göta canal.

The climate is very severe in the north of the peninsula, belonging, as it does, to the frigid zone; nevertheless, a fiery summer's heat contrasts strikingly with the intense cold of winter. The climate of Southern Sweden is much like that of north-east Germany; the south-western shores of Norway have a moist and somewhat remarkably mild coast climate.

The mineral products of the Scandinavian peninsula are, above all others, iron, next to which we find silver, copper, marble, lime, cobalt, alum, sulphur, vitriol, saltpetre, salt; wood is exceedingly abundant. The rearing of cattle amounts to nothing; but wild animals are in abundance, as the reindeer, the elk (a species very closely allied to the American moose, and not at all to the American elk), stag, roebuck, wild boar, beaver, foxes, hares, otter, ermine, &c. Among the birds, the eider duck is of much importance. The principal fish are herring, salmon, trout, cod, sturgeon, eels, plaice, haddock, &c.

The population amounts to 4,400,000, of which one fourth belongs to Norway. The Swedes and Norwegians, like the Danes and Icelanders, are of Germanic descent. Among the population are to be distinguished the Lapps (termed Finns in Norway), probably of Mongolian descent, and the true Finns; Sweden includes 9000 Lapps, 7500 Finns, 2500 Germans, 1000 Jews; while in Norway, where there are about 13,000 Lapps and 6000 Finns, no Jews whatever are suffered. The prevalent religion is the Lutheran. The intellectual culture of the peninsula is on an elevated stage. For instruction in the higher branches of scientific education, the universities of Upsala and Lund in Sweden, and that of Christiania in Norway, are well adapted.

Sweden and Norway are two entirely independent kingdoms, governed, since 1814 by one king, and since 1818 by the House of Bernadotte (present ruler Oscar I.). The Swedish constitution dates from 6th June, 1809, the Norwegian from 17th May, 1814. The Swedish diet consists of four chambers (nobles, clergy, burghers, and peasants); the Norwegian Storting of two sections, Lagthing and Odelthing. The powers of the Storting are very great; it can assemble without having been convened by the king, who is obliged to accept any project which has been three times presented by the Storting.

The revenues of Sweden amounted, from 1844–1847, to about five millions and a half of dollars, the expenditures to over eight millions. The Swedish army embraces over 34,000 men, with 95,000 as a reserve force; the Norwegian about 12,000. The Swedish navy counts twenty-one ships of the line, eight frigates, eight smaller vessels, and 247 gun-boats; the Norwegian, six small vessels of war, and 117 gun-boats.

Divisions. Sweden possesses about 3,250,000 inhabitants in eighty-eight towns, and in respect to government, is divided into twenty-four lan or shires, and 117 fogderies or districts; politically, it is divided into three principal parts, with twenty-three subdivisions, namely:

I. *Svealand* or Sweden proper, Svea Rike, the central portion contains eight lans or shires; Stockholm (pop. 84,000), Upsala, Westeras, Nykoping, Oerobro, Carlstad, Stora-Kopparberg, Gefleborg; corresponding to the ancient provinces of Upland, Sodermanland, Westmanland, Nerike, Warmerland, Dalarne or Dalecarlia, Gestrikland, and Helsingland.

II. *Götaland*, Gotland or Gothia, the southern part of the kingdom, contains the lans of Linkoping, Calmar, Jonkoping, Kronenberg, Blekinge, Skaraborg, Elfsborg, Gotheburg and Bohus, Halmstad, Christianstad, Malmolus, Gottland; corresponding to the ancient provinces of Ostergothland, Smaland, Blekinge, Westergothland, Dasland, Halland, Skane, and the islands of Gottland and Oeland.

III. *Norrland* or Nordland contains the lans of Nordbotten, Westerbotten, Westnorrland or Hermäsand, Jamtland; corresponding to the ancient provinces of Wester Bothnia and Lapmark, Medelpada and Angermanland, Jamtland and Herjealden.

Norway has a population of about 1,150,000, and is divided into amts, under the following arrangement:

I. *Christiania*, with the capital Christiania, also called Oploe (pop. 25,000), with the amts, Hedermarken, Aggerhuus, Smaalehnen, Christians-amt, Buskerud, Brodsberg, and Jarlsberg-Laurvig.

II. *Christiansand*, with the amts, Stavanger, Mandal, and Nedenäs.

III. *Bergen*, with the amts, South and North Bergenhuus.

IV. *Trondhjem* or *Drontheim*, with the amts, Romsdal, S. and N. Drontheim, Nordland, and Finmarken. The latter, the northern part of the kingdom, contains innumerable islands. To Nordland belong the Loffoden Islands, with a population of 8000, divided into the fogderies Loffoden and Westeraalen.

10. RUSSIA (*Plate 25*).

The Russian monarchy, in three continents, Europe, Asia, and America, is included between the meridians of 21° and 220° E. from Greenwich, equal in the latitude of the Arctic circle to 7590 statute miles, and between the parallels of $38^{\circ} 40'$ and 78° N. lat. This immense extent is divided by Behring's Strait into two distinct portions, the eastern of which forms the north-west point of America. Of the larger, or European and Asiatic portion, the breadth varies from 1900 to 460 miles, giving an area of 3,409,000 square geographical miles, or 4,740,000 square statute miles: it is bounded on the north by Norway and the Arctic Ocean, on the east by the Pacific Ocean, on the south by the Chinese empire, Tartary, the Caspian Sea, Asiatic and European Turkey, the sea of Azof, the Black Sea, and Austria (Galicia), and on the west by Moldavia, Austria, Prussia, the Baltic, Sweden, and Norway.

By far the most important mountain range is that of the Ural, on the boundary between Europe and Asia. This is nearly 1400 miles long, and in Kamen Peak reaches a height of 5,397 feet. There are no mountains in the interior; nevertheless, the great Sarmatian plain is interrupted by two elevations, the Baltic Ural in the north, and the Carpathian Ural in the south, which begins even in Germany. A mountain range in the Crimea attains an elevation of over 5000 feet, in Tschatirdag. In South Russia are vast woodless steppes or plains, and in Lithuania extended marshes.

The waters of Russia are exceedingly numerous. The principal rivers are: of those emptying into the Arctic Ocean, the Petschora, the Mesen, the Northern Dwina, formed by the union of the Jug and the Suchona, and the Onega; into the Baltic empty, the Kymen, the Neva, the Narowa, the Pernau, the Dwina, the Niemen (called Memel after its entrance into Prussia), the Weichsel (belonging to Prussia in its lower part); into the Black Sea and Sea of Azof, the Danube, the Dniester, the Dnieper (with the Beresina, the Southern Bug, &c), the Don, and the Kuban; into the Caspian Sea, the Wolga, the largest stream in Europe, and the Ural. Besides these, Russia possesses some important canals, which serve to unite the White and Caspian Seas, the Baltic and the Black Seas. There are also numerous lakes. The Ladoga is the largest not only in Russia, but in

all Europe ; smaller lakes are the Onega, Peipus, Bielos, Saima, Ilmen, &c. Finland is especially rich in lakes ; in the south there are numerous salt lakes, the most important of which is the Elton.

The climate of so immense a country would naturally be very various ; the northern part belongs to the frigid zone, and is bound up in perpetual snow and ice ; in the south are cultivated the subtropical fruits and the vine. As a general rule, the climate is more severe than in other parts of Europe of equal latitude ; although in equal latitudes, the eastern portion is much more severe than the western.

The principal products are grain, hemp, flax, flaxseed, timber, iron, fish, and wild animals. Rye is more cultivated than the other cerealia, wheat being only raised in appreciable quantity in Poland, and rice and Indian corn in the south. In particular portions of the empire are produced wine, spices, medicinal plants, and tobacco. The forests of the north consist of pines and birches ; those of the south of beech. The principal domestic animals are cattle, sheep, hogs, and horses ; there are reindeer in the north, and camels in the south. The wild animals are bears, wolves, sables, beavers, martins, weasels, foxes, badgers, wild cats, lynxes, otters, squirrels, and in the south, antelopes. Besides those of iron, there are valuable mines of copper, platinum, lead, and (in the Ural) gold. Large quantities of rock salt are also mined.

The sum total of the population amounts, in all probability, to about sixty-six millions, of which sixty millions belong to the European portion, including Poland and Finland. Excepting about one million of Mongolians (Bashkirs, Kirgises, Calmucks, Tartars, Samoiedes), the entire European population belongs to the Caucasian race, which is here reducible to the following stocks : 1, the *Slavonic*, constituting the great majority, and divided into the Russians, Poles, Letts, Lithuanians, Serbians, Bulgarians, Wallachians, and Moldavians ; 2, *Tschudic*, about three to four millions, divided into Finns, Lapps, Esthonians, Livonians, Permians, Tschereemisians, Tschuwaschians, &c. ; 3, *Germanic*, about half a million ; 4, *Jewish*, about one million and a half ; 5, *Greek*, about half a million. The general ratio of population is very small, not much over ten to the square mile, and even in the European portion scarcely thirty-five.

The established religion of Russia is the Greek Catholic Church. Next to this, the Roman Catholic (to which most of the Poles belong) has the greatest number of adherents. There are, in addition, over two millions and a half of Protestants, one million and a half of Jews, and one million and three quarters of Mahommedans, thirty thousand Lamaïtes, &c. The intellectual culture of the people is greatly in arrear, although much has been done within the last century. At the head of the seminaries of learning stand seven universities : those of St. Petersburg, Moscow, Dorpat, Helsingfors, Charkow, Kiew, and Kasan. These exercise a general supervision over all schools of lower grade. The inhabitants of the arable regions carry on a lively trade in the products of their farms, and the arts and manufactures exhibit a steady progression in excellence and extent. The most important articles of trade are candles, tallow, soap, leather, furs, sail cloth, linen, silks, potash,

glass, powder, sugar, wooden ware, ropes, twine, &c. The inhabitants of the extreme north fish and hunt exclusively, while those of the Steppes raise cattle.

The form of government is an absolute monarchy. The head of the state (Emperor, now Nicholas I., born 1796, of the House of Holstein-Gottorp) must profess the religion of the Greek Church. No accurate idea can be formed of the revenues and expenditures of Russia, as nothing official is published on the subject. The European land force, with the reserve, is stated to amount to 568,000 men, with 97,640 horses, and 1672 pieces of artillery; to this must be added the Caucasian army, the Finnish, the Orenburg, and Siberian corps, together with various corps of Cossacks. The navy is estimated at fifty-six ships of the line and forty-eight frigates, without the steamboats and smaller vessels.

Political division. The Russian Empire is divided into governments, of which forty-nine belong to European Russia in its most restricted sense, eight to Finland, and five to Poland. In addition to these, we shall present the historical division.

I. Great Russia contains nineteen governments: Moscow (with the old capital Moscow, pop. 360,000), Woronesch, Kursk, Tambow, Rjäsan, Tula, Orel, Kaluga, Smolensk, Pskow or Pleskow, Novogorod, Kostroma, Twer, Wladimir, Nischnei-Novogorod, Jaroslaw, Wologda, Olonetz, Archangel.

II. *Little Russia*, whose eastern portion was formerly called the Ukraine, contains four governments: Kiew, Tschernigow, Pultawa, and Charkow (the Slobodian Ukraine).

III. The *Baltic Provinces* consist of four governments: Ingermanland or St. Petersburg (with the capital and royal residence St. Petersburg, pop. 450,000), Esthonia, Livonia, and Courland.

IV. The *Kingdom of Kasan* consists of five governments: Kasan, Simbirsk, Pensa, Wjatka, and Perm.

V. The *Kingdom of Astrachan* consists of four governments: Astrachan, Orenburg, Saratow, and Stawropol (Caucasus).

VI. *South Russia*, the most southern part, contains five governments: the land of the Don Cossacks, Jekaterinoslaw, Tauria, Chersonesus, and Bessarabia.

VII. *West Russia*, the south-western part, includes the governments of Witebsk, Mohilew, Podolia, Volhynia, Minsk, Grodno, Wilna, and Bialystok. Of these provinces, Pultawa has the largest population, and Astrakan the smallest; while on the other hand, Archangel is of greatest extent, and Bialystok of least.

Other lands belonging to the European portion of Russia are:

VIII. The *Grand Principality* or *Viceroyalty of Finland*, containing 1,400,000 inhabitants, divided into eight governments: Nyland, Abo, Tawassehuus, Wiborg, St. Michael, Kuopio, Wasa, and Uleaborg.

IX. The *Kingdom of Poland*, with a population of 4,857,000, of which, in 1845, 3,800,000 were Roman Catholics, 550,000 Jews, 250,000 Lutherans, 240,000 United Greeks, 4200 Independent Greeks, 3800 Reformed, 3800

Greek Sectarians, 1250 Mennonites, 550 Moravian Brethren, 350 Zigeuni, and 300 Mohammedans. With the capital Warsaw (pop. 165,000) Poland is divided into five governments : Warsaw, Radom, Lublin, Augustowo, and Plock.

Russia in Asia embraces : 1. Siberia, with three millions of inhabitants, divided into the general governments of West Siberia and East Siberia, of which again the former is divided into the governments of Tobolsk, Omsk, and Tomsk ; the latter into those of Jeniseisk, Irkutsk, Iakutsk, Ochotsk, and the district of Kamtschatka. 2. Caucasus, consisting of the government of Grusia-Imereti, and the province of Caspia, or the former province of Georgia (or Grusia), Imiretia, Armenia, Tscherkessia, Schwirwan, and Daghestan. In a great part of these provinces, the Russian government is entirely repudiated.

Russia in America contains a population of probably sixty thousand souls.

11. TURKEY (*Plate 26*).

The Turkish or Ottoman Empire is included between the parallels of 31° and 49° north latitude, and is divided into European and Asiatic Turkey ; the former, with an area of about 144,000 square geographical miles, and a population of thirteen millions, the latter with an area of 336,000 square geographical miles, and population of ten millions. Turkey in Europe, a part of the peninsula of Greece, is bounded on the north by Austria and Russia, on the west by Austria, the Adriatic and Ionian seas, on the south by Greece, and on the east by the Archipelago, the Sea of Marmora, and the Black Sea.

A considerable mountain divides the land into two tolerably equal parts, of which the northern includes Northern Bosnia, Servia, Bulgaria, Wallachia, and Moldavia ; the southern, Rumelia, Macedonia, Albania, and Thessaly. It bears various names : in the west, where it is parallel to the Adriatic, it is called the Dinarian Alps, then Zamora, Argentara, Perserin, Schardagh, &c. At about the middle of the peninsula, the principal arm, termed Egrisu, divides into two branches, the more northern of which is called the Balkan, and afterwards Eminehdagh, the southern, Despoto Mountain. Towards the south are sent off from Schardagh, the Hellenic Mountains, called Voradagh in the north, and Mezzovo or Pindus in the south. From this pass off, towards the west, the Chimæro or Akrokeraunian Mountains ; towards the east, the Volutza Mountains ; and towards the north, the Livadian Mountains.

The only river of any importance in Turkey is the Danube. Into it empty from the west, or north, on Turkish territory, the Schyl or Schyll, the Aluta, the Dumbowitza with the Ardsisch, the Jalonitza, the Sereth with the Bystritza, and the Pruth, the latter the boundary to Russia ; to the right, or from the south, the Sau or Save, the Morawa, the Isker, the Wid, and the Jandra. Much smaller rivers, and indeed only coast streams, are

Maritza, Karasu or Nestus, Karasu or Strymon, Vardar, Indje-Karasu, Salambria, which empty into the Archipelago, also the Narenta, the Drin, the Vojussa, and the Aspropotamo, emptying into the Adriatic. The inland lakes are of no importance.

The climate of Turkey, north of the main range of mountains, is very similar to that of Germany; that to the south resembles that of Italy: it is everywhere healthy. The fertility of the country is extraordinary: of the vegetable kingdom, we find grain (in abundance), Indian corn, millet, wine, southern fruits, oil, cotton, flax, hemp, tobacco, wood of all kinds. To the animal kingdom belong beautiful horses, camels, asses, mules, horned cattle, hogs, bees, and wild beasts of various kinds. The mineral products are rock and sea salt, saltpetre, sulphur, and various metals, although the system of mining is very rude.

The population of Turkey in Europe is composed of Turks (about 700,000), Greeks (1,200,000), and Slavonians (principally in the north, Serbians, Bulgarians, Croats, Montenegrins: in all, about six millions); there are also about two millions of Wallachians and Moldavians (remains of the original population), 1,600,000 Albanians or Arnauts, 250,000 Jews, 100,000 Armenians, and 250,000 Zigeuni. The religion of the land is the Mohammedan, although there are about eight millions and a half of Christians, mostly Roman and Greek Catholics. The scientific culture of the Turks is very slight. Their principal occupation consists in agriculture and raising of cattle. The arts and manufactures are mainly conducted by Christians and Jews, and the very important foreign commerce is shared by these with the Armenians.

The government of Turkey is a despotism, the supreme ruler (now Abdul Meschid, born 1822) bearing the title of Padishaw, Pasha, Grand Sultan, Grand Turk, or Emperor. The minister of the Padishaw, to whom is delegated the supreme power, is called Grand Vizier; next to him, the Divan, composed of the principal state officers, exercises a great influence. Nothing definite is known as to the finances or military forces of Turkey.

Divisions. Politically, European Turkey is divided into Turkey proper and secondary Turkey. The former, besides the two capitals of Constantinople and Adrianople, is divided into five eyalets or provinces (each under a pasha of three tails), which again are subdivided into thirty-three sandschaks (under pashas of two tails). These eyalets are: 1, Rum-Ili, and 2, Silistria, which include the old provinces of Bulgaria, Thessaly, Thrace and Romania, Macedonia and Albania; 3, Bosna or Bosnia; 4, Deria, also called Dschesair or the viceroyalty of the Capudan Pasha, embraces the Turkish Islands of the Egean Sea, except Crete, Taso, Samothraki, Imbro, Stalimene, &c., as also the neighboring coast country; 5, Kirid, formed by the island of Crete, with a few neighboring islands.

Turkey secondary, or the vassal states, are: 6, Principality of Serbia, pop. one million, under Prince Alexander Georgewitsch (cap. Belgrade).

7. Principality of Wallachia, pop. 950,000, since 1849 under the Prince or Hospodar Barbo Stirbey (cap. Bucharest).

8. Principality of Moldavia, pop. 450,000, under Hospodar Gregorius Alexander Ghika (cap. Jassy), also

9. The territory of Montenegro, on the borders of Dalmatia, the inhabitants of which, under their Vladika the Bishop of Cettigne, are almost entirely independent of the Porte.

Turkey in Asia is divided into nineteen *eyalets*, indicated on the map. Of these numbers, ten to fifteen constitute Asia Minor proper or Natolia; sixteen to nineteen, Armenia; twenty to twenty-three, Mesopotamia; and twenty-four to twenty-eight, Syria.

As to a Turkey in Africa, nothing more can be said than that the states of North Africa, to wit, Egypt, Tripoli, and Tunis (and excepting Fez, Morocco, and the French colony of Algiers), are little more than nominally subject and tributary to the Porte.

12. GREECE (*Plate 27*).

The kingdom of Hellas or Greece, containing about 14,000 square geographical miles, is included between the meridians of $18^{\circ} 44'$ and $25^{\circ} 14'$ longitude east of Greenwich, and the parallels of $36^{\circ} 30'$ and $39'$ N. lat. It is bounded on the north by Turkey, in all other directions by the Mediterranean and Egæan seas. Northern Greece is traversed by the Hellenic Mountains, already referred to under the head of Turkey, and attaining, in Guiona, a height of 8538 feet, in Parnassus, 8068 feet. Other lofty summits are Oeta and Helicon. Even the Peloponnesus is very mountainous; the highest peak being Taygetos (7904 feet), and Zyria or Cyllene. The only rivers are the Aspropotamo (otherwise the Achelous), Evenus, Cephissus, Rusia or Ryzo (Alpheus), and Yri or Wasiliko (Eurotas). The climate of the valleys is very mild, but many of the mountain peaks are covered with snow for several months in the year. The chief products are oil, cotton, dried currants, tobacco, wine, madder, honey, and silk.

The inhabitants (850,000) are chiefly modern Greeks (a mixture of descendants of the ancient Greeks, and of Albanians, Wallachians, Slavonians, &c.); a portion consists also of Jews, Albanese, &c. The Greek Catholic is the prevailing religion; but on the islands there are some 20–30,000 Roman Catholics. Agriculture and manufactures are experiencing a progressive elevation in point of rank; and from the favorable position of the country, commerce has long been in a flourishing condition. The university of Greece, at Athens, stands at the head of the schools of public instruction, which have greatly increased since the erection of the state of Greece.

Until 1821, Greece was subject to Turkey, but having battled successfully for independence, it was recognised as free in 1829. Since 1832, it has formed a kingdom, governed by Prince Otto of Bavaria (brother of the

present king of Bavaria), born 1815. In consequence of a revolutionary movement in September, 1843, a constitution was granted on the 16th March, 1844. The revenues of the state amount to about 2,400,000 dollars. The army includes 8900 men; the present navy, only two corvettes, two steamboats, three brigs, five cutters, and twelve gunboats.

Since 1838, Greece has been divided into twenty-four dioceses or governments; its natural divisions are:

I. *Northern Greece* or *Livadia*, with the seven dioceses: Attica (with Megaris and Ægina, cap. Athens, with 26,000 inhabitants), Bœotia, Phthiotis, Phocis, Eurytania, Ætolia, and Acarnania.

II. The *Peninsula of Peloponnesus*, or the *Morea*, with twelve dioceses: Argolis (with the island Spezzia and Hermione), Hydra (island), Corinth, Achaia, Cynæthe, Triphylia, Messenia, Mantinea, Gortynia, Lacedæmon, Laconia (cap. Maina).

III. The *Islands*, with the five dioceses: Eubœa (largest island of Greece, 1120 square geographical miles, with the islands Skiathos, Scopeles, &c.), Tinos (with Andros), Syra (with the islands Keos, Cythnos, Milos, Syphnos, Cimolos, Pholegandros, Sicinos), Naxos (with Paros), and Thera (with the islands Amorgos, Ios, and Anaphe).

The seven Ionian Islands, situated to the west and south of Greece and Turkey: Corfu, Paxo, Santa Maura, Cephalonia (largest of all), Theaki, Zante, and Cerigo, with a population of 220,000, and with several smaller islands, constitute a republic under the protection of England. According to the constitution of 2d May, 1817, the executive power is in the hands of a senate of six members, the president of which is nominated by the king of England. The legislative assemblage embraces forty members, of whom eleven are chosen by the English Lord High Commissioner.

13. ITALY (*Plate 24*).

Italy, or the Apennine peninsula, with its islands, lies between the meridians of 5° and 18° 30' east longitude from Greenwich, and the parallels of 36° and 46° 30' N. lat., embracing about 120,000 square miles (excluding Corsica, which belongs to France). It is bounded on the north by Switzerland and the Tyrol, on the east by Austria (Illyria) and the Adriatic and Ionian seas, south and west by the Mediterranean and Tyrrhenian seas, and north-west by France.

Two great ranges of mountains belong either wholly or in part to Italy: the Alps and the Apennines. The Alps traverse the northern parts, and send the following chains into Italy: 1, the Sea or Maritime Alps, on the Gulf of Genoa (Monte Viso, 13,599 feet high), north of which are: 2, the Cottian Alps (Mont-Cenis, 6,772); 3, the Gray or Graian Alps (Mont-Iseran, 13,279); 4, the Pennine Alps (Monte Rosa, 15,210); 5, the Lepontine Alps, which only touch Italy in part. Between the Alps and the Apennines lies a hilly region. The Apennines, at whose northern slope the peninsula proper commences, join on to the Maritime Alps at the Col di Tenda, pass

through Italy, first in an easterly direction, then south-east from lat. 44° to 41° , in a main range, whose greatest central elevation is in Mont Sasso (9521 feet), and finally re-appear in Sicily across the Straits of Messina. The local divisions of the Apennines are into Ligurian, Etrurian, Roman, Neapolitan, and Calabrian; the Abruzzi in Lower Italy constitute the highest and roughest. Mount Vesuvius near Naples, and Mount Etna in Sicily (10,874 feet), constitute isolated volcanic peaks.

The principal rivers of Italy are: 1. The Po, which rises in Monte-Viso, flows through the whole of Upper Italy in an easterly direction, and empties into the Adriatic Sea by seven arms, after receiving the Dora Balta, the Sesia, the Tessin, the Adda, the Oglio, and the Mincio, on the left; and the Tanaro, the Trebbia, the Taro, and the Panaro, on the right. 2. The Adige, which comes from Germany and empties into the Adriatic not far from the Po, to which it is connected by branches. 3. The Arno, in Tuscany, empties into the Tyrrhenian Sea not far from Pisa. 4. The Tiber, united to the Arno by the channel of Chiana, empties by two arms into the Tyrrhenian Sea near Ostia. The coast rivers of Upper Italy are: Brenta, Piave, Tagliamento; of Lower Italy, Garigliano, Volturno, Pescara, Osanto, &c. The only Italian lakes of importance are in Upper Italy on the southern slope of the Alps; they consist of Lakes Maggiore, Como, and Garda, with the Tessin, the Adda, and the Mincio, flowing through them respectively. Only the second of the above-mentioned lakes belongs entirely to Italy; the two others lie with their northern extremities, the one in Switzerland, and the other in the Tyrol. In the valleys of many rivers, especially on the coast, there are considerable tracts of marsh land; among them are the Maremma of the Delta of the Po, those in Tuscany, and the Pontine marshes in the southern part of the Papal states.

The climate of Italy is very various. In the south may be seen the palm and sugar cane, in the north the thermometer sinks sometimes to 15° F. The climate of Sicily and of southern Naples bears much resemblance to that of Africa, and the Sirocco or south wind is exceedingly oppressive. In many parts of the country, noxious exhalations rise from the ground.

The chief products of Italy are: 1. From the mineral kingdom, iron (especially from Elba), mercury, alabaster, marble, stone coal and lignite, salt, saltpetre, brimstone (Sicily), alum, sal-ammoniac, tripoli, pumice, and various mineral pigments. From the vegetable kingdom: grain (especially wheat and Indian corn), rice, oil, wine, southern fruits, carob beans, sugar-cane, chestnuts, flax, hemp, tobacco, liquorice, and cork. From the animal kingdom: horses (especially in Naples), cattle, sheep, asses, mules, buffalo, goats, silkworms, bees, fish, oysters, &c. In the Alps are chamois, marmots, wolves, and bears.

The population of Italy amounts, perhaps, to twenty-four millions. Lucca is most densely, and Sardinia most thinly inhabited. The Italians are a mixed race, speaking a language with numerous dialects closely allied to the Latin; there are likewise French, Celtish, and German dialects in the north, and Greek in the south. The prevailing religion is the Roman Catholic, although there are about 36,000 Jews on the peninsula, and in

Sardinia from 23,000 to 24,000 Waldenses. Popular education, excepting in the Lombardo-Venetian and Tuscan kingdoms, is in rather a low state. The culture of grain and the olive is most successful in the north, where also the silkworm and the products of mining are of importance. The manufactured products are silks, glass ware, mirrors, porcelain, soap, paper, gloves, essences, &c. Trade is extensively prosecuted, being greatly favored by the position of the country, but commerce is mostly in the hands of foreigners, and internal traffic thrives only in Upper Italy, where there are excellent roads and numerous canals.

Italy contains three kingdoms: the Lombardo-Venetian (under Austrian sway), Sardinia, and the two Sicilies; one Grand Duchy, Tuscany; the Papal States; two Duchies, Modena and Parma; one republic, San Marino; and finally two islands, Corsica and Malta, belonging respectively to France and England.

I. *The Lombardo-Venetian Kingdom* (see Austria).

II. *Kingdom of Sardinia.* This state, with an area of 29,534 English square miles, contains 4,650,000 inhabitants (according to the census of 1839). The present king, Victor Emanuel II. (born 1820), of the House of Savoy-Carignan, has ruled since 1849, and according to the constitution of March 5th, 1848. According to this, the crown shares the lawgiving power with two chambers, a senate (the members chosen by the king), and an elective chamber. The land forces amount, on the peace establishment, to 37,500 men, and on the war, to 146,000; the navy, to four frigates, four steamboats, three brigantines, &c., in all seventy-seven vessels of war.

Divisions. The state is divided into the provinces of the mainland, with 4,125,000 inhabitants, and the island of Sardinia with 525,000. The former consist of the Principality of Piedmont, the Duchies of Savoy, Montserrat, and Genoa, a portion of Milan, and the county of Nice (Nizza); these are divided into eight circles, all of which, excepting Savoy, are named after their chief towns: 1, Turin, with the capital and royal residence, containing 125,000 inhabitants; 2, Cuneo or Coni, the southern part of Piedmont; 3, Savoy, with the capital Chambery; 4, Alessandria, and 5, Novara (the Sardinian portion of Milan); 6, Aosta, the northern part of Piedmont; 7, Nice; 8, Genoa, with the island of Capraia, not far from the coast of Tuscany.

The island of Sardinia (cap. Cagliari) is ruled by a vice-king, and is divided into the circles, Cagliari, Sassari, and Nuoro.

III. *The Duchy of Parma.* The Duchy of Parma is surrounded by Sardinia, Lombardy, Modena, and Tuscany, and has about 500,000 inhabitants, on an area of about 1760 square geographical miles. The present king, Charles III., of a Spanish branch of the House of Bourbon, has ruled since 1849. The country consists of the Duchies of Parma (cap. Parma, with 40,000 inhabitants) and Piacenza, to which were added, in 1848, the districts of Pontremoli, Bagnone, Villafranca, &c., derived partly from Modena, partly from Tuscany.

IV. *Duchy of Modena.* This is surrounded by Lombardy, Parma, the

Papal States, and by Tuscany, and possesses an area of 1672 square geographical miles, with a pop. of 500,000.

The present duke, Francis V., from a branch of the House of Austria, has reigned since 1846. The land consists of the four Duchies of Modena (with the capital and royal residence of the same name, pop. 27,000), Reggio, Guastalla (separated from Parma in 1848), and Massa.

V. *Grand Duchy of Tuscany.* Tuscany is bounded on the north by Modena and the Papal States, east and south-east likewise by the Papal States, and on the west by the Tyrrhenian Sea. With an area of 6880 square geographical miles, it has a population of 1,800,000. The present grand duke, Leopold II. (born in 1797) of a branch of the House of Austria, has reigned since 1824. The government is a constitutional monarchy, according to the constitution of 15th February, 1848. The lawgiving power is shared by the prince with two chambers, of which the first consists of members chosen for life by the grand duke, the second of members elected by the people. The revenues of the state amount to twenty-five millions of lira or 3,875,000 dollars. The forces embrace 5500 men. According to the earlier arrangements, the land was divided into five compartimentos or circles, named after the chief towns: Florence (with the capital and royal residence, containing 102,000 inhabitants), Pisa (with the island Elba), Siena, Arezzo, and Grossetto: to these Lucca has been added since 1848, with 170,000 inhabitants.

VI. *The Papal States.* The Papal States, with an area of about 12,000 square geographical miles, contain three millions of inhabitants. The present pope, Pius IX., of the family of Mastai-Ferrenti, born in 1792, has reigned since 1846. The form of government was an absolute monarchy, up to 1848; then for a short time a constitutional monarchy, until the proclaiming of a Roman Republic, February 9th, 1849; since the downfall of which latter, it has again become an absolute monarchy. The revenues, before the breaking out of the Revolution, amounted to 9,600,000 scudi, or to the same number of American dollars. The papal army is at present entirely disbanded. Since 1831, the land has been divided into one comarca, Rome, with the capital and royal residence of the same name (170,000 inhabitants); six legations, named according to the principal towns: Bologna, Ferrara, Forli, Ravenna, Urbino (with Pesaro), and Velletri; and thirteen delegations, likewise named after the principal towns: Ancona, Macerata, Camerino, Fermo, Ascoli, Perugia, Spoleto, Rieti, Viterbo, Orvieto, Frosinone, Civita-Vecchia, and Benevento.

VII. *The Republic of San-Marino.* This small republic lies within the boundaries of the Papal States. It possesses a population of about 7600, on an area of about twenty square miles. The chief town contains 5500 inhabitants. At the head of the state stand two capitani regenti, elected for six months.

VIII. *The Kingdom of the Two Sicilies.* This constitutes the southern part of Italy, and contains 8,423,060 inhabitants to an area of about

43,052 English square miles. The present king, Frederick II., born 1810, of the Spanish line of the House of Bourbon, has ruled since 1830. The form of government is a constitutional monarchy. According to the constitution of February 10th, 1848, the king shares the law-giving power with two chambers, one of peers (chosen by the king in unlimited number for life), and a chamber of deputies, one to every 40,000 of the population. The relation of Sicily to the state is not yet definitively established.

The army, before the outbreak in Sicily, consisted of about 49,000 men, without the reserve forces; the navy, of one ship of the line and five frigates, one corvette, five brigantines, two galliots, and fourteen steamboats.

The state is geographically divisible into two principal parts.

a. Sicily this side of the straits, also called Naples, with 6,383,000 inhabitants, is divided into fifteen intendancies. Of these, the old province of Terra di Lavoro was constituted by Naples (with the city Naples, pop. 400,000, and the islands of Capri, Ischia, and Procida), Terra di Lavoro, Principato citeriore, and Principato ulteriore; Abruzzo ulteriore I., A. ulteriore II., and A. citeriore, form the old province Abruzzo; Capitanata, Molise, Terra di Bari, Terra di Otranto, constitute the ancient Apulia; and finally Basilicata, Calabria citeriore, and Calabria ulteriore I. and II., the ancient Calabria.

b. The kingdom of Sicily beyond the straits, consists of the island of Sicily, also of the Lipari and Ægidian Islands: it contains about 2,040,000 inhabitants, and is divided into the following intendancies: Palermo (with the capital of same name, pop. 170,000), Girgenti, Trapani, Caltanissetta, Messina, Syracuse, and Catania.

IX. *The Islands of Malta, Gozzo, and Comino*, contain about eighty square geographical miles, and 124,000 inhabitants. The capital, La Valetta, with 60,000 inhabitants, is situated on the island of Malta.

14. THE AUSTRIAN MONARCHY (*Plate 17*).

The Empire of Austria is situated between the meridians of $8^{\circ} 29'$ and $26^{\circ} 29'$ longitude east of Greenwich, and between the parallels of $42^{\circ} 15'$ and 51° N. lat. It is bounded on the south and east by Turkey, on the north-east and north by Russia, to the north and west by Prussia, Saxony, Bavaria, and Switzerland, and to the south and west by Sardinia, Parma, Modena, the Papal States, and the Adriatic Sea. Its area amounts to about 193,000 square geographical miles.

The principal mountains of Austria are the Alps and the Carpathians. The Alps divide into the following chains: 1. The eastern Rhætian Alps, with one main and two secondary chains (highest point Ortlerspitz, 12,851 feet). 2. The Norian Alps, consisting of three main chains (here belong the Styrian, Austrian, and east Salzburgian Alps; highest point Gross-

glockner). 3. The Carniac or Carinthian Alps, attaining a height of eight to nine thousand feet. 4. The Julian or Krainian Alps, the Terglou, 9386 feet. The Carpathians divide into six main groups: 1. The Central Carpathians or the Krapack Mountains, attaining a height of 8611 feet in Lomnitzer Spitze. 2. The Beskides and Babia Goru. 3. The Lesser or Hungarian Carpathians. 4. The Hungarian Erzgebirge (over 6200 feet high). 5. The Carpathian Waldgebirge. 6. The Siebenbürgian Carpathians, over 9500 feet high. The space between the Alps and Carpathians is filled by the Hungarian plains, of which that of Lower Hungary covers an area of over 24,000 square geographical miles.

Pre-eminent among the rivers of Austria stands the Danube, with its numerous tributaries. Those of the right bank are the Inn, with the Salzach, Traun, Ens, Leitha, Raab, Drau, Sau. To the left are the March or Morawa, Waag, Neutra, Gran, Eypel, Theiss (largest tributary of the Danube). The Weichsel forms the north-western boundary of Galicia.

The principal productions of Austria, which is more highly endowed by nature than any other country in Europe, are from the mineral kingdom: gold, silver, copper, lead, tin, iron, mercury, cinnabar, cobalt, calamine, arsenic, zinc, precious stones, marble, alabaster, gypsum, sulphur, peat, lignite, stone coal, salt, soda, vitriol, alum, saltpetre, and mineral waters. From the vegetable kingdom are derived, grain, Indian corn, rice, garden and kitchen vegetables, fruits, timber, wine, tobacco, hops, flax, hemp, saffron, madder, safflower, liquorice wood, mastich, and succory or chicory. The animals are horses, cattle, buffaloes, sheep, hogs, goats, asses, bears, lynxes, wolves, marmots, chamois, tortoises, domestic fowls, pheasants, salt and freshwater fish, bees, silkworms, and leeches.

The population of Austria amounts to nearly thirty-eight millions; it is densest in the Italian provinces, and most sparse in the Tyrol. The inhabitants belong to four principal stocks: to the German (about eight millions), the Slavic (over fifteen millions), the Hungarian (five millions and a half), and the Græco-Latin (over eight millions). The Slavi are divisible into the Tschechs, Moravians, Slovaks, Poles, Ruthenes, Slovenes, Croats, Slavonians, Serbians, Dalmatians, and Istrians. To the Hungarians or Magyars belong the Szekls in Siebenbürgen; to the Græco-Latin stock, the Italians, Wallachians, Moldavians, and Greeks. To the above-mentioned stocks must be added about 700,000 Jews (mostly in Galicia and Hungary), 93,000 Zigeuni, Armenians, &c. The prevailing religion is the Roman Catholic; there are, however, about three millions of independent Greeks, over two millions Reformed, 1,200,000 Lutherans, 50,000 Socinians, 17,000 Arminians, 700,000 Jews, &c. At the head of numerous establishments of learning stand nine universities; those of Vienna, Prague, Innsbruck, Grätz, Olmütz, Pesth, Lemberg, Padua, and Pavia; also the Academy of Sciences in Vienna, founded in 1846. The principal manufactured products are linens, sail cloths, point lace, cotton and silk goods, cloths, shawls, carpets, hats, paper, leather ware, tobacco, sugar, soap, wax, fabrications of gold and silver, chemical apparatus, iron, glass, mirrors, &c.

The form of government, up to March, 1848, was an absolute monarchy;

since that, it has been changed to the constitutional form. According to the chartered constitution of March 4th, 1849, which is to avail for the whole empire, the emperor (since 1849, Francis Joseph, born 1830) shares the lawgiving power with two houses, an upper and a lower house. In addition to this, each crown land has a special constitution and a special diet. The revenues of the state (Hungary excepted) amounted, in 1847, to over 151 millions of gulden, or more than seventy-one millions of dollars. In the half year ending April, 1847, the receipts amounted to over forty-five millions of gulden, the expenditures to nearly ninety-one millions. The army, in 1847, consisted of 315,000 infantry, 49,000 cavalry on the peace establishment, and 489,000 infantry, and 65,000 cavalry on the war footing. In addition to these were 26,000 artillery, and various extra corps, the engineer corps, pioneer corps, &c. At present all the troops are divided into five army corps, of which the fifth embraces the military limits; the four others include 358 battalions, 281 squadrons, and 766 pieces of artillery. The navy consists of three frigates, two corvettes, five brigs, one steamer, two galliots, and eight gunboats.

According to the new constitution, the whole state is divided into the following crown lands :

I. *German*. 1. Grand Duchy of Austria above the Ens, or Upper Austria, pop. 704,572, cap. Linz. 2. Archduchy of Austria below the Ens, or Lower Austria, with 1,417,783 inhabitants, cap. Vienna, at the same time capital of the whole empire, with 410,000 inhabitants. 3. Duchy of Salzburg, pop. 146,519, cap. Salzburg. 4. Duchy of Styria, pop. 999,681, divided into three circles, those of Grätz, Bruck, and Marburg, cap. Grätz. 5. Duchy of Carinthia, pop. 316,838. 6. Duchy of Crainia, pop. 474,525, cap. Laibach. 7. Coast lands with Friaul and the counties Görz and Gradiska, pop. 500,000, cap. Trieste. 8. Counties of Tyrol and Vorarlberg, pop. 867,178, divided into four circles, those of Innsbruck, Brixen, Trient, and Vorarlberg, cap. Innsbruck. 9. Kingdom of Bohemia, pop. 4,513,074, divided into seven circles; their capitals are Prague, Budweis, Prachatitz, Gitschin, Böhmisches-Leippa, Eger, and Pilsen. 10. Margravedom of Moravia, with 1,826,057 inhabitants, divided into the circles of Brünn and Olmütz, cap. Olmütz. 11. Duchy of Silesia, with 467,420 inhabitants.

II. *Extra German*. 1. Kingdom of Galicia, with the Duchy of Cracow, pop. 5,250,000, cap. Lemberg. 2. Duchy of Bukowina, pop. 354,000, cap. Czernowitz. 3. Kingdom of Dalmatia, Croatia, and Slavonia, with the coast land of Croatia, pop. 1,300,000. 4. Kingdom of Hungary, pop. ten millions, cap. Ofen. 5. Grand Principality of Siebenbürgen, pop. 2,182,000, cap. Klausenburg. 6. Lands of the military limits, pop. 1,226,000, divided into the Croatian, Hungarian, and Siebenbürgian. 7. Lombardo-Venetian kingdom, pop. five millions, divided into the government of Lombardy (cap. Milan) and Venice, cap. Venice.

15. PRUSSIA (*Plate 18*).

The state of Prussia is situated between the meridians of $5^{\circ} 44'$ and $22^{\circ} 44'$ of longitude east of Greenwich, and the parallels of $40^{\circ} 8'$ and $55^{\circ} 52'$ N. lat., and is divisible into a large eastern and a smaller western portion. The former is bounded on the east by Russia and Poland, south by Austria (Galicia, Moravia, Bohemia), Saxony, and the Duchy of Saxony, west by the Electorate of Hesse-Hanover, Brunswick and Mecklenburg, and north by the Baltic. The smaller portion is bounded to the N. E. and S. by various German states, Bavaria, Hesse-Darmstadt, Nassau, Waldeck, Hesse-Lippe, and Hanover, and west by France, Belgium, and the Netherlands. The area of the whole monarchy amounts to about 81,280 square geographical miles, of which a sixth belongs to the western part.

The mountains of Germany which belong under this head are: in the south-east, the Sudetes, the Glatzer- and Riesen-Gebirge (highest summit 5300), the Thuringerwald; in the western part, the Egge, the Westerwald, the Hunsrück, the Lippische Wald, the Sauerland Mountains, the Siebengebirge, the Hochwald, and the Eiffel. The principal streams are: 1. The Weichsel, which rising in Germany enters Galicia, returns again to Germany, and below Marienwerder divides into two arms, the most eastern of which, the Nogat, empties by twenty mouths into the Frische Haff, while the western, which retains the name of Weichsel, divides near the sea into the Old and Dantzig-Weichsel, and empties by fourteen mouths into the Frische Haff, and by two into the Gulf of Dantzig. 2. The Oder, which rises in Moravia at the foot of the Sudetes, passes into Silesia, and flows for over five hundred miles through Prussian territory. Its tributaries are, to the right, Olsa, Klodnitz, Bartsch, Warthe, Ihna; to the left, Neisse, Ohlau, Weistritz, Katzbach, Bober, Görlitz, Neisse, and Ucker. 3. The Elbe, which rises on the southern slope of the Riesengebirge, and empties into the North Sea about eighty-five miles below Hamburg. Such of its tributaries as belong here, are: to the right, the Black Elster, and Havel with the Spree; to the left, Mulde and Saale. 4. The Weser merely touches the territory of Prussia, forming for a short distance the line of separation from Brunswick. 5. The Rhine, from Bingen to above Coblenz, forms the boundary to Nassau, and passes through the western part of the state to enter the Netherlands below Emmerich. Its Prussian tributaries are, to the right, Lahn, Sieg, Wupper, and Ruhr; to the left, Nahe, Moselle, and Erft.

The climate and productions of Prussia are not essentially different from those of Germany. In addition to the cerealia, the culture of flax, tobacco, hops, fruit, and the vine, is of importance. Cattle are not raised in large quantities, but the rearing of sheep is attended to more and more. Prussia is very rich in minerals, especially silver, copper, lead, iron, salt, sulphur, lignite, and stone coal.

The population amounted, at the end of 1846, to 16,112,948 souls. It is densest in the Rhine provinces, and sparsest in Pomerania. The

predominant races are the German, Slavic (Poles, Wendes, Lithuanians, &c.), Walloons, and Jews. The inhabitants, in respect to their religious belief, may be divided into Evangelical (1846, 9,835,000), Roman Catholics (over six millions), 215,000 Jews, 14,500 Mennonites, 1675 adherents to the Greek Church (Philippones). There are also Moravian Brethren, Hussites, Unitarians, and Herrnhuters. In intellectual culture, as well as in mechanical skill, the people take high rank. At the head of the seminaries of instruction, stand the universities of Berlin, Königsberg, Halle, Greifswald (all protestant), those of Bonn and Breslau (mixed), and the Roman Catholic academy at Münster.

The Prussian form of government is a constitutional monarchy, ruled, since 1840, by King Frederick William IV. (born 1795), of the House of Hohenzollern. After the national convention called together in May 22, 1848, had been dissolved in December, 1848, without having agreed with the king upon a constitution, a chartered constitution was given to Prussia, with the proviso of a revision in the proper mode of legislation. According to this, the law-making power is exercised in common by two chambers, one consisting of 180, and the other of 350 members, all of them elected. According to official publications, the revenues for 1849 amounted to eighty-eight millions and a half of thalers (fifty-nine millions of dollars), and the state debt to 162,861,444 thalers (108,574,296 dollars). The standing army on the peace establishment amounts to 121,100 men, the Landwehr of the first summons to 96,100, that of the second to 62,600. The war footing amounts to 325,300 field troops, and 167,500 garrison soldiers (without counting the officers, commissioned and non-commissioned).

Prussia is divided into the following eight provinces: I. *Prussia*, consisting of: *a*, East Prussia, area 11,296 square geographical miles, pop. 1,480,000; circles, Königsberg and Gumbinnen; *b*, West Prussia, 7552 square geographical miles, pop. 1,019,000; circles, Dantzic and Marienwerder. The capital of the province is Königsberg, with 75,000 inhabitants. II. *Posen*, 8576 square geographical miles, pop. 1,364,000; circles, Posen and Bromberg. The capital, Posen, has 40,000 inhabitants. III. *Pomerania*, area 9184 square geographical miles, and 1,165,000 inhabitants, including the largest island of Germany, Rügen (pop. 3700); circles, Stettin, Cöslin, and Stralsund. The capital is Stettin, with 41,500 inhabitants. IV. *Silesia*, area 11,872 square geographical miles, pop. 3,066,000; circles, Breslau, Oppeln, and Liegnitz, capital Breslau, with 112,000 inhabitants. V. *Brandenburg*, area 11,744 square geographical miles, pop. 2,067,000; circles, Potsdam (with Berlin) and Frankfort. Berlin, with 300,000 inhabitants, is the capital of the province, and at the same time of the monarchy. VI. *Saxony*, area 7376 square geographical miles, pop. 1,742,000; circles, Magdeburg, Merseburg, and Erfurt, capital Magdeburg, with 55,800 inhabitants. VII. *Westphalia*, 5588 square geographical miles, pop. 1,446,000; circles, Münster, Minden, and Arnsberg, capital Münster, with 23,000 inhabitants. VIII. *Province of the Rhine*, area 7792 square geographical miles, pop. 2,763,000; circles, Cologne, Düsseldorf, Coblenz,

Trier, and Aix la Chapelle. The capital Cologne, with the suburbs, has 95,000 inhabitants.

16. GERMANY (*Double Plate 15, 16*).

Germany, including the Prussian provinces of Posen and Prussia, and the Austrian provinces hitherto reckoned with Germany, extends from $44^{\circ} 50'$ to $55^{\circ} 50'$ of N. lat., and from $5^{\circ} 44'$ to $22^{\circ} 44'$ of longitude east of Greenwich ($23^{\circ} 30'$ to $40^{\circ} 30'$ east of Ferro). It is bounded on the north by the North Sea, Denmark (Schleswig), and the Baltic; east by Russia, Poland, Galicia, and Hungary; south by Croatia, the Adriatic Sea, Italy, and Switzerland; and west by France, Belgium, and the Netherlands. The area amounts to over 209,600 square geographical miles.

The Alps, the most important of the mountains of Germany, have already been considered under Austria, only a very small portion coming into Germany proper, or into Bavaria. North of the Alps, the plateau of South Germany expands itself to the Danube. The mountain districts of Middle Germany may be divided into a western, middle, and eastern portion. In the western, we find on the left bank of the Rhine, the Haardt (1800 to 2200 feet), the Donnersberg, the Hundsrück, the Eifelberg, and the high Veen, which borders on the Ardennes. In the middle part between the Rhine and the Elbe, are: *a*, between the Rhine, Danube, Naab, and Main: the Schwarzwald, the German and Franconian Jura, the Odenwald; *b*, between the Rhine, Main, Werra, and Weser: Taunus, Vogelsgebirge, the Spessart, the Rhone Mountain, the Westerwald, Siebengebirge, the Wesergebirge, the Egge, the Teutoburgerwald; *c*, between the Weser, Werra, Main, Naab, Danube, March, and Elbe: the Hartz, the Frankenwald, the Thüringerwald, the Fichtelgebirge, the Böhmerwald, the Saxon Erzgebirge, &c. In the eastern part, there are only the Sudetes, individual regions of which bear different names: the Meissner Highland or Saxon Switzerland, Lausatian Mountains, Isargebirge, Riesengebirge, Silesian Erzgebirge, Schweidnitz Mountains, &c. The northern part of Germany consists of the north German plateau.

The rivers may be divided into those of the northern and southern slopes. To the former belong the Rhine, Ems, Weser, Elbe, Oder, Weichsel, Pregel, and Memel (Niemen), together with several coast streams, as the Vechte, Trave, Warnow, Recknitz, Peine, &c. To the southern slope belong the Danube and the Etsch. Lakes of some size occur only in south Germany; thus, besides the Boden-see we here find Lakes Chiem, Ammer, Tegern, König, Traun, &c.

The climate of Germany, on the whole, is mild, although severe in the Alpine districts. The climate of the north is generally moister and more variable than that of the south; in the east, the extremes of temperature are greater than in the west. In the valleys of South Tyrol, and on the coast land along the Adriatic, the climate is much like that of northern Italy.

The products are, on the whole, much the same with those already given under the heads of Prussia and Austria. From the mineral kingdom are derived, iron, lead, silver, copper, zinc, tin, mercury, cinnabar, &c.; from the vegetable, Indian corn, grain in general, chestnuts, almonds, &c.; from the animal, most European species of mammalia and birds, and of fishes, sturgeon, salmon, trout, eels, pike, &c.

The population of Germany, with the provinces recently added, amounts to forty-five millions; densest in the kingdom of Saxony, and sparsest in Pomerania and Mecklenburg-Strelitz. This, besides the Germans proper, consists of seven to eight millions of Slavi, numerous Lithuanians in the province of Prussia, 400,000 Italians (in Illyria and the Tyrol), 300,000 Walloons, about 400,000 Jews, 500 Greeks and Armenians, and 500 Zigeuni. In a denominational point of view, there are over twenty-two millions of Roman Catholics, twenty-one millions of Lutherans and Reformed, 35,000 Herrnhuters and other sects, with 400,000 Jews. The arts and sciences have attained to a high degree of advancement among the inhabitants of Germany; and the state of education is in a highly prosperous condition. Of the twenty-five universities, six are in Prussia, five in Austria, three in Bavaria, two in Baden, one to each in Würtemberg, Hanover, Saxony, Saxe-Weimar, Mecklenburg-Schwerin, Hesse-Darmstadt, Electoral Hesse, and Holstein. There are also several hundred Gymnasia (Colleges), and about one hundred large public libraries. All branches of agriculture, forest culture, cattle breeding, &c., are prosperous. Foreign commerce is carried on mainly from the towns of Hamburg, Triest, Bremen, Stettin, Lübeck, Emden, Kiel, Dantzig, Berlin, Frankfurt on the Main, Leipzig, Nürnberg, Augsburg, and Vienna. The German Zollverein or Customs Union, has greatly contributed to the flourishing state of trade: this embraces all the states excepting Austria, Hanover, Oldenburg, Schaumburg-Lippe, the two Mecklenburgs, Holstein, the three Hanse towns, and Lichtenstein.

The political relations of Germany are very undecided. The commonwealth consists of thirty-eight larger and smaller states, which, after the dissolution of the German Empire in 1806, were held together by the German Alliance (established by the act of June 9th, 1815). This faulty political creation fell to the ground soon after the meeting of the German Constitutional Convention at Frankfurt on the Main, May 18th, 1848 (June 12, 1848): this established a provisional central government, and at the head of affairs was established Archduke John of Austria as regent. The convention above referred to, fixed upon a plan, according to which the king of Prussia was to come in as the head of affairs; but it separated in May of the same year, without having had the plan recognised and carried out. By a compact concluded on the 30th September, 1849, at Vienna, between Austria and Prussia, a new provisional central government has been established, to be managed by these two powers in common, and to consist of two members from each state: nevertheless, this little promising plan still lacks the assent of a portion of the remaining states. In fact, the regent, on the 6th October, 1849, announced his return to the exercise of his former office in Austria.

The individual states of Germany, omitting those already mentioned under the heads of Austria and Prussia, are as follows :

I. *Kingdom of Bavaria*, with 22,304 square geographical miles, pop. 4,504,874. Maximilian II. (born 1811), king since 1848. Annual revenues about thirty-two millions of gulden (over twelve millions of dollars). Army, 76,294 men. Divided into six circles : Upper Bavaria, cap. Munich, with 113,000 inhabitants ; Lower Bavaria, cap. Passau ; Palatinate, cap. Speier ; Upper Palatinate and Regensburg, cap. Regensburg (Ratisbon) ; Upper Franconia, cap. Baireuth ; Middle Franconia, cap. Ansbach ; Lower Franconia and Aschaffenburg, cap. Würzburg.

II. *Kingdom of Saxony*, area 4352 square geographical miles, pop. 1,836,433. Frederick Augustus II., king since 1836. Constitution of September 4, 1831. Annual revenues, 4,200,000 dollars (American). Army formerly of 16,355 men : at present it is to consist of two per cent. of the population. Divided into five circles : Meissen (cap. Dresden, pop. 89,000), Leipzig (cap. Leipzig, pop. 60,000), Erzgebirge (cap. Freiberg, pop. 12,000), Voigtland (cap. Plauen, pop. 10,000), and Lausitz (cap. Bautzen, pop. 8000).

III. *Kingdom of Württemberg*, area 5760 square geographical miles, pop. 1,743,827. William I. (born 1781), king since 1816. Constitution dates from 25th Sept., 1819, but is shortly to be revised. Revenues, sixteen millions and a half of gulden (nearly \$7,000,000). Army 19,000 (war footing). Divided into four circles : circles of the Neckar (cap. Stuttgart, pop. 47,000) ; Schwarzwald (cap. Reutlingen) ; Jaxt (cap. Ellwangen) ; and Danube (cap. Ulm).

IV. *Kingdom of Hanover*, area 11,184 square geographical miles, pop. 1,758,847 ; revenues, five millions of dollars. Army of 21,200 men. The constitutional law of 6th August, 1848, has been essentially changed by the law of 5th September, 1848. Ernest August (born 1771) has ruled since 1837. Divided into six Landdrosteis : Hanover (cap. Hanover, pop. 38,000), Hildesheim, Lüneburg, Stade, Osnabrück, and Aurich.

V. *Grand Duchy of Baden*, area 4448 square geographical miles, pop. 1,349,930. Leopold, Grand Duke since 1830. Present constitution from 22d August, 1818. Revenues, about twenty-five millions of florins (ten millions of dollars). The land is divided into four circles : Middle Rhine (cap. Carlsruhe, with 25,000 inhabitants) ; Upper Rhine (cap. Freiburg), Seekreis (cap. Constance), Lower Rhine (cap. Mannheim).

VI. *Electorate of Hesse*, area 3344 square geographical miles, pop. 732,000. Frederick William I. (born 1802), elector since 1847. Settled constitution since January 8, 1831. Revenues, about 2,900,000 dollars. The land is divided into four provinces : Lower Hesse (cap. Cassel, pop. 35,000) ; Upper Hesse (cap. Marburg) ; Fulda, and Hanau.

VII. *Grand Duchy of Hesse Darmstadt*, area 2832 square geographical miles, pop. 853,000. Ludwig III. (born 1806), Grand Duke since 1848. Constitution of 17th December, 1820. Revenues, 7,800,000 florins. Divided into three provinces : Starkenburg (cap. Darmstadt, pop. 30,000) ; Rhine-Hesse (cap. Mayence) ; Upper Hesse (cap. Giessen).

VIII. *Grand Duchy of Holstein and Lauenburg*, with an area of 2800 square geographical miles, and pop. 526,850 (see under Denmark).

IX. *Grand Duchy of Luxemburg with Limburg*, area 1392 square geographical miles, pop. 389,000 (see under Netherlands).

X. *Grand Duchy of Mecklenburg-Schwerin*, area 3,648 square geographical miles, and 528,000 inhabitants. Frederick Franz, Grand Duke since 1842. The state constitutional law promulgated October 11, 1849. Gross revenues, 2,818,000 dollars. The land is divided into the Duchies of Schwerin and Güstrow, the Principality of Schwerin, the Manor of Wismar, and the District of Rostock.

XI. *Grand Duchy of Mecklenburg-Strelitz*, area 576 square geographical miles, pop. 96,300. George Frederick, Grand Duke since 1816, rules according to the ancient constitution, which applied to both Mecklenburgs. The state is divided into the Duchy of Strelitz and the Principality of Ratzeburg.

XII. *Grand Duchy of Oldenburg*, area 1824 square geographical miles, pop. 279,000. A constitutional government was introduced February 18, 1849, by Grand Duke Augustus, who has reigned since 1829. The revenues for 1849 amounted to 576,000 dollars, the expenditures to about 856,000 dollars. The state is divided, both politically and physically, into three parts: Duchy of Oldenburg, Principality Lübeck, and Principality Birkenfeld (on the left bank of the Rhine); to these must be added the Herrschaft of Kniphausen.

XIII. *Grand Duchy of Saxe-Weimar-Eisenach*, area 1072 square geographical miles, pop. 257,000. Charles Frederick, Grand Duke since 1828. Constitution of May 5th, 1816. Revenues over 500,000 dollars. Divided into the Principality of Weimar (cap. of same name, pop. 12,000) and Eisenach.

XIV. *Duchy of Brunswick*, area 1152 square geographical miles, pop. 269,000. Present ruler, Duke William (since 1830). Constitution proclaimed October 12th, 1832. Revenues, 841,000 dollars. Divided into six circles: Brunswick, Wolfenbüttel, Helmstädt, Holzminden, Gandersheim, and Blankenburg, cap. Brunswick, pop. 38,000.

XV. *Duchy of Nassau*, area 1312 square geographical miles, and 418,600 inhabitants, Duke Adolphus, ruler since 1839. Constitution proclaimed September 1, 1814, and changed 1848. Revenues over two millions of florins. Divided into twenty-eight amts. cap. Wiesbaden, pop. 12,300.

XVI. *Duchy of Saxe-Coburg-Gotha*, area 592 square geographical miles, and 147,000 inhabitants. Duke Ernest, ruler since 1844. This state is divided into the Principality of Coburg and Gotha, each of which has its own constitution, the former since 8th September, 1821, the latter since March 25th, 1849. Revenues of the former, 122,217 dollars; of the latter, 580,170 dollars. Capitals, Coburg, with 10,000, and Gotha, with 14,000 inhabitants.

XVII. *Duchy of Saxe-Meiningen*, area 736 square geographical miles, pop. 160,500. It consists of a Henneberg portion, a Coburg portion, the Duchy of Hildburghausen, and the Principality of Saalfeld. Bernhard, Duke since 1803. Constitution of August 23, 1829. Revenues, 1,208,208 florins; cap. Meiningen, pop. 6000.

XVIII. *Duchy of Saxe-Altenburg*, area 384 square geographical miles, pop. 130,000. Duke George, ruler since 1848. Constitution of April 29th, 1831. Budget for 1849, 426,000 dollars. Divided into the circles of Altenburg and Saal-Eisenberg. Capital Altenburg, with 15,000 inhabitants.

XIX. *Duchy of Anhalt-Dessau*, area 272 square geographical miles, pop. 6300. Leopold Frederick, Duke since 1817. Constitution of September 29th, 1848; cap. Dessau, with 12,000 inhabitants.

XX. *Duchy of Anhalt-Bernburg*, area 224 square geographical miles, pop. 48,400. Duke Alexander Charles, ruler since 1834; cap. Bernburg, with 6000 inhabitants.

XXI. *Duchy of Anhalt-Köthen*, area 240 square geographical miles, pop. 43,000. At present governed by the Duke of Anhalt-Dessau. Capital Köthen, with a pop. of 6500.

XXII. *Principality of Schwarzburg-Sondershausen*, area 240 square geographical miles, pop. 58,700. Günther Frederick Charles, Prince since 1834. Constitution of September 21st, 1841; cap. Sondershausen, pop. 4000.

XXIII. *Principality of Schwarzburg-Rudolstadt*, area 240 square geographical miles, pop. 68,900. Günther Frederick, Prince since 1807. Constitution of January 2, 1816. Revenues, 250,000 florins; cap. Rudolstadt, pop. 5300.

XXIV. *Principality of Hohenzollern-Sigmaringen*, area 256 square geographical miles, pop. 45,500. Prince Charles Anthony, ruler since 1831; cap. Sigmaringen, with 1600 inhabitants.

XXV. *Principality of Hohenzollern-Hechingen*, area 85 square geographical miles, pop. 20,000. Prince Frederick, ruler since 1838; cap. Hechingen, with 3000 inhabitants.

XXVI. *Principality of Waldeck*, area 352 square geographical miles, pop. 58,800; consists of the Principality proper, and of the county Pyrmont, capital of the former Korbach; the princely residence is Arolsen. Prince George Victor, ruler under the constitution of 28th May, 1849.

XXVII. *Principality of Lippe*, area 320 square geographical miles, pop. 108,000. Prince Leopold, ruler under the constitution of 1836; cap. Detmold, pop. 5000.

XXVIII. *Principality of Schaumburg-Lippe*, area 160 square geographical miles, pop. 28,800. The present prince, George William, came into power in 1787. Constitution of 15th January, 1816; cap. Bückeburg, with 4200 inhabitants.

XXIX. *Principality of Reuss*, of the old line, or Reuss-Greiz, area 100 square geographical miles, pop. 33,800. Henry XX., Prince since 1836; cap. Greiz, pop. 7000.

XXX. *Principality of Reuss*, of the new line, area 336 square geographical miles, pop. 70,000, consisting of the counties, Schleiz, Lobenstein-Ebersdorf, and Gera. Henry LXII., Prince since 1816. Capitals, Gera, with 10,000, and Schleiz, with 5000 inhabitants.

XXXI. *Principality of Lichtenstein* has an area of 40 square geogra-

phical miles, and pop. 6400. Prince Aloys Joseph, ruler since 1836. Principal place, the village of Vaduz, pop. 1000.

XXXII. *Landgrafschaft of Hesse-Homburg*, area 80 square geographical miles, pop. 24,400. Ferdinand, Landgrave since 1848; cap. Homburg, with 3600 inhabitants.

XXXIII. *Free town of Hamburg*, area 112 square geographical miles, pop. 188,000, of which 148,000 belong to the town proper.

XXXIV. *Free town of Bremen*, area 80 square geographical miles, pop. 72,800, of which 55,000 belong to the town. Constitution from 18th April, 1849.

XXXV. *Free town of Frankfurt on the Main*, area 25 square geographical miles, pop. 68,200, of which 58,000 belong to the town.

XXXVI. *Free town of Lübeck*, area 96 square geographical miles, pop. 47,000, of which 26,000 belong to the town. Constitution of April 8, 1848.

THE RAILROADS OF CENTRAL EUROPE (*Double Plate 15, 16*)

The railroad lines opened in the present age throughout Europe require some special notice; and as we have now completed our review of the different European states, this will be an appropriate place for such consideration. In this we omit England, whose railroads are so numerous as to have nearly taken the place of all her highways. We may remark in general, that in the British islands on the 1st of July, 1849, there were no less than 5447 $\frac{1}{4}$ miles of railroad open and in actual use.

Germany is far ahead of the rest of the continent of Europe, in respect to railroads, as at the end of September, 1849, there were 4186 miles of road open to travel, 2048 of these, or over one third, being government roads. The latter are as follows: 1. In *Austria*: from Prague to Olmütz, with a branch from the Bohemian Trübau to Brünn, and from Mürzzuschlag by Grätz and Cilly to Laibach, in all 414 miles. The former is to be continued north to the borders of Saxony at Tetschen, the latter from Laibach to Triest over the Karst; the one will be finished in the spring of 1850, the other in 1852. 2. In *Bavaria*: from the limits of Saxony, between Hof and Plauen, by Bamberg, Nürnberg, Donauwörth, and Augsburg, to Kaufbeuern, with a branch from Augsburg to Munich, 306 miles in all. The continuation from Kaufbeuern to Lindau is in progress, as also a road from Bamberg by Würzburg and Aschaffenburg to Hanau. 3. In *Württemberg*: from Heilbronn, by Ludwigsburg and Stuttgart to Geisslingen, also from Biberach to Friedrichshafen on the Bodensee, in all 115 miles. The section from Geisslingen by Ulm to Biberach will probably be finished in 1850. Connecting links to Baden and Bavaria are in distant contemplation. 4. In *Baden*: from Mannheim by Heidelberg, Karlsruhe, Offenburg. Freiburg to Efringen, near Basel, with branches to Kehl and Baden-Baden, as also from Friedrichsfeld to the borders of the Grand Duchy of Hesse, in all 193 miles. 5. In *Hesse-Darmstadt* and *Frankfurt on the Main*: from

Frankfurt by Darmstadt to the borders of Baden (called the Main-Neckar Line) with branches to Offenbach, in all $38\frac{1}{2}$ miles. 6. In *Hanover*: from Hanover to Brunswick; from Hildesheim by Celle to Harburg (the two roads cross each other at Lehrte); from Hanover by Wunstorf to Bremen; and from Wunstorf to Minden, in all 214 miles, without counting the tracts lying in the territories of Prussia, Hesse, Brunswick, Lippe-Schaumburg, and Bremen. 7. In *Brunswick*: from Oschersleben by Wolfenbüttel and Brunswick to the borders of Hanover; also from Wolfenbüttel to Neustadt in the Hartz; in all 70 miles. In *Saxony* (with Saxony-Altenburg): the Saxony-Bavarian railroad from Leipzig by Altenburg, Reichenbach, and Plauen, to the borders of Bavaria (completed, with the exception of the part from Reichenbach to Plauen, to be ready in 1851), with a branch to Zwickau; also the Saxony-Bohemian road from Dresden to Königsstein (the continuation of which, to the Bohemian borders, is in progress, and mostly finished), in all $99\frac{3}{4}$ miles.

Roads built and equipped by joint stock companies are as follows: 1. In *Austria*: the Kaiser-Ferdinand railroad from Vienna by Lundenburg and Prerau to Oderberg, where it joins on to the Prussian railroads, with branches from Vienna to Stöckerau, from Genserndorf to the borders of Hungary (continued to Pressburg), from Lundenburg to Brünn, and from Prerau to Olmütz, in all 253 miles. Also the Vienna-Gloggnitz railroad from Vienna by Baden and Viennese-Neustadt to Gloggnitz, with branches to Bruck on the Leitha, to Laxenburg and to Oedenburg, $74\frac{1}{2}$ miles. Finally, the Budweis-Linz-Gmundner horse road, the oldest railroad in Germany, which was partly in use in 1828, 122 miles long. 2. In *Bavaria*: the short road from Nürnberg to Fürth, notable as being the first German road on which steam was used (opened December 8, 1835); also on the left bank of the Rhine, the Palatine Ludwig's road from Ludwigshafen and Speier by Neustadt and Kaiserslautern to Berbach, 69 miles. 3. In *Hesse*, *Nassau*, and the *Territory of the free town of Frankfurt*: the Taunus road, from Frankfurt on the Main to Wiesbaden, with branches to Biberich and Soden, $28\frac{3}{4}$ miles; also the short road from Frankfurt to Hanau, 9 miles. 4. In *Kur-Hesse*: the Frederick-William-Northern railroad from the borders of Saxe-Weimar at Gerstungen, by way of Cassel, to Carlshafen on the Weser, 85 miles. 5. In *Saxony*: the Leipzig-Dresden road, $71\frac{1}{2}$ miles; also the Saxony-Silesia road from Dresden by way of Löbau to Görlitz with branches from Löbau to Zittau, 85 miles; the Chemnitz-Riesa road from Riesa by Döbeln to Limmritz (the road has stopped at this point), $18\frac{1}{2}$ miles. 6. In *Prussia* and the *neighboring territories* (Saxony, Anhalt, Mecklenburg-Schwerin, Lauenburg, Hamburg, Lübeck, Saxe-Weimar, Saxe-Gotha). *a.* The Lower Silesia-Mark road from Berlin by Frankfurt on the Oder to Breslau, with branches from Kohlfurt to Görlitz, and from Hansdorf by Sagan to Glogau, in all 285 miles. *b.* The Cologne-Minden road, 170 miles long, with branches from Münster to Hamm, $20\frac{3}{4}$ miles, and from Dortmund to Elberfeld, $35\frac{1}{2}$ miles. *c.* The Berlin-Hamburg road, 168 miles. *d.* The Berlin-Anhalt road from Berlin by Jüterbog, Wittenberg, and Dessau, to Köthen, with a branch from Jüterbog to Röderau at Riesa,

125½ miles. *e.* The Upper Silesian road from Breslau by Oppeln and Kosel to Myslowitz, 124 miles, with connecting links from Breslau to Freiburg and Schweidnitz, 41½ miles, from Brieg to Neisse, 28¾ miles, from Kosel to Oderberg (Williams road), 33½ miles, and from Myslowitz to Cracow. *f.* The Thuringian road from Halle by Naumburg, Weimar, Erfurt, Gotha, and Eisenach, to Gerstungen, 115½ miles, with a small branch to Waltershausen. *g.* The road from Berlin by Stettin to Stargard, 102½ miles, and *h.* the road from Berlin by Potsdam to Magdeburg, 89½ miles. *k.* The road from Leipzig by Halle and Köthen to Magdeburg, 70 miles, with a branch from Köthen to Bernburg, 10¾ miles. *l.* The road from Magdeburg to Wittenberg on the Elbe (to connect with the Berlin-Hamburg road), 66 miles. *m.* The road from Magdeburg by Oschersleben to Halberstadt, 35½ miles. *n.* The Rhenish road from Cologne by Aix-la-Chapelle to Herbesthal on the borders of Belgium, 53 miles, with the road from Cologne to Bonn, 18½ miles. *o.* The road from Düsseldorf to Elberfeld, with the branch from Steele to Bowinkel, in all 35½ miles. 7. In *Mecklenburg*: the Mecklenburg road from Wismar by Schwerin to Hagenow on the Berlin-Hamburg road, 39 miles (to be opened further north to Rostock, with a branch to Güstrow, in 1850). 8. In *Holstein*: the road from Altona to Kiel, formerly termed Christian VIII. Baltic railroad, with branches to Glückstadt and Rendsburg, in all 96½ miles.

From the above, it is evident that German railroads already reach the bounds of Germany in the following places: at Myslowitz, from which a road goes to Cracow, this again connecting with the Warsaw-Vienna road to Warsaw: the borders of Hungary are touched in three places; crossed by roads to Presburg, Bruck, and Oedenburg; at Basel, where a small portion only of the Baden railroad lacks completion; at Herbesthal, on the boundary of Belgium and Prussia, where the Belgian railroad joins on directly to the Prussian (Rhenish); and at Kehl opposite Strasburg. To sum up the whole, there are in Prussia 1564 miles of railroad, in Austria 773 miles, in Bavaria 377 miles, in Saxony 255 miles, in Hanover 223 miles, in Baden 193 miles, in Würtemberg 105 miles, &c. With the exception of about 575 miles, all the German railroads form a continuous network, extending from Kiel on the Baltic to Laibach, and from the borders of Galicia to those of Belgium.

Of the remaining continental countries, France comes next in respect to extent of railroads; the sum total amounting to 1840 miles. The lines most worthy of mention are: 1. The north railroad from Paris by Arras to Douay, and thence in two branches by Lille and Valenciennes to the borders of Belgium, there connecting with the roads of the latter country; also branches from Amiens to Boulogne, from Lille to Calais and Dunkirk, and from Creil to St. Quentin (opened to Chauny). 2. From Paris by Rouen to Havre, with a branch from Rouen to Dieppe. 3. From Paris to Versailles (two roads on either bank of the Seine), with a continuation to Chartres. 4. From Paris to Orleans, and from Orleans on the one side by Tours to Saumur (part of the road to Nantes), and on the other, to Vierzon (central road), from which point again, one road runs to Chateauroux,

another by Bourges to Nerondes. 5. From Paris by Epernay to Chalons on the Marne (commencement of the road to Strasburg). 6. From Paris to Lyons, open on the route from Paris by Montereau to Tonnerre, with a branch from Montereau to Troyes, and from Dijon to Chalons on the Saone. In addition to these, there are small roads from Paris to St. Germain and Sceaux. The following roads are at present unconnected with the capital. From St. Etienne to Andrezieux, from this to Roanne, and from St. Etienne to Lyons, the oldest railroads in France (the first mentioned has been in existence since 1827, the others since 1832 and 1833); from Nismes by Montpellier to Cette, from Beaucaire by Nismes to Alais and Grand Combe; from Strasburg to Basel, with a branch from Mühlhausen to Thann; from Bordeaux to Teste; from Avignon to Marseilles. To these must be added numerous coal roads.

Belgium has over 460 miles of railroad (three fourths built since 1835 at the public expense) which traverse the country in every direction. One main line passes from Herbesthal on the borders of Prussia, by way of Lüttich, Landes, Löwen, Mecheln, Ghent, and Bruges, to Ostende; this is crossed at Mecheln by the second line, which goes from Antwerp by Brussels, Hal, Braine-le-Comte, and Mons, to Quiévrain on the borders of France, and in French territory by way of Valenciennes to Paris. Lateral lines lead from Landes by St. Trond to Hasselt, from Braine-le-Comte by Charleroi to Namur, from Ghent by Courtrai to the borders of France (in the direction of Lille), and to Tournai. During the last year, private roads have been laid out: 1, from Ghent to Antwerp; 2, from Bruges to Courtrai (West Flanders); 3, from Tournai to Jurbise, on the road passing from Brussels to Mons; and 4, many other smaller tracts.

The kingdom of the Netherlands has likewise its railroad system, consisting of two lines: the Holland railroad from Amsterdam by Haarlem, Leyden, and the Hague, to Rotterdam; and the Rhine railroad from Amsterdam by Utrecht to Arnheim, the two amounting to about 120 miles. The first tract was opened in 1839, the latter in 1847.

In Switzerland we find only a few short roads, as the one from Zurich to Baden, 14 miles, &c. In Denmark, from Copenhagen to Roeskilde 18½ miles, the Seeland railroad built 1847; and in Spain (not included in the chart), the road from Barcelona to Mataro, about 18½ miles, built in 1848.

In Italy, which in its northern part at least belongs here, we find the following railroads: 1. In Upper Italy, from Chambery to the Lake of Bourget, scarcely 5 miles in length; from Turin to Montcaliere, as the beginning of the Sardinian network of roads; from Milan to Monza, with a continuation to Como, in progress as far as Camnago; from Venice by Padua and Vicenza to Verona, and from Milan to Treviglio (the deficient link between Treviglio and Verona has been under way for seven years). 2. In Middle Italy, from Florence by Pisa to Leghorn, with branches from Pisa to Lucca, from Empoli to Siena, from Florence to Prato. 3. In Lower Italy, from Naples to Nocera and Castellamare, from Naples to

Capua and Nola. The oldest Italian railroad is that from Naples to Portici, opened in 1839.

In Hungary and Galicia, the following railroads have been constructed since 1840: from Presburg by Tyrnau to Szered; from Pesth on the one side to Szolnok, on the other, to Waitzen; from Odenburg to Katzeldorf (joining on to the Vienna-Gloggnitz road), and from Presburg to Marchegg (joining on to the Kaiser-Ferdinand-north railroad); in all about 148 miles. The Galician road from Cracow to the borders of Prussia (called the Cracow-Upper Silesian road, 32 miles long) has already been mentioned among the German railroads.

In Poland, a railroad was opened in 1845-1848, from Warsaw to Cracow (the Warsaw-Vienna road), with a branch to Lowicz, in all 198 miles. In Russia, a road of 16 miles was opened in 1836-1837, from St. Petersburg by Zarskoe-Selo to Pawlowsk. Whether the colossal railroad from St. Petersburg to Moscow (now under way for several years) be opened at all, or how far, nothing satisfactory can be learned.

The railroads constructed on the continent of Europe, up to this time, may be estimated at 7360 miles, more than half of them in Germany; if to this be added the 5447½ in England, we shall have the large number of 12,807½ miles of railroad in the whole of Europe. The number of miles of road opened and in use on the 1st of January, 1849, in the United States of America, amounted to 6117½ miles, and the sum total, by the end of 1852, will in all probability reach, if it do not exceed 10,000 miles.

II. ASIA (*Plate 28*).

Having already referred to the principal physical features of this great continent, we shall here confine ourselves to a brief consideration of its political relations. The inhabitants, whose numbers have been estimated at five hundred millions, though not from any very sure data, may be divided into three races: Caucasian, Mongolian, and Malay. Only a small portion belong to the latter. The Caucasian may be divided into the Caucasian stock proper (Georgians, Tscherkessians, &c.), the Indo-Persian stock (Hindoos, Afghans, Persians, Armenians, &c.), and the Arabian stock (Tartars, Arabians, Turks, and Turcomans). The Mongols are divided into the Mongols proper, Japanese, Chinese (with the inhabitants of Thibet and Further India), and the various tribes in Siberia. Ethiopians occur only on a few of the Indian Islands. The prevailing religions are those of Budha, Brahma, the Grand Lama, and Mohammed; in addition to these we find Christianity in Asiatic Russia and in the East Indies. In a political point of view, the following lands and states are the most important: in treating of them we shall proceed from north to south

1 ASIATIC RUSSIA.

We have already referred, under the head of European Russia, to this part of Asia. It is divided into Siberia and the Caucasus, the former of which has an area of 3,600,000 square geographical miles, with not over thirteen millions of inhabitants, or about three souls to the square mile; the latter has, with an area of 48,000 square geographical miles, two millions and a half of inhabitants. Among the inhabitants are two millions of Tartars, about one million of Caucasians, 25,000 Mongolians, 110,000 Armenians, besides Tartars, Slavi, and various tribes in Eastern Siberia of uncertain descent. The peninsula of Kamtschatka belonging to Siberia, has about 64,000 square geographical miles of area, and only 5000 inhabitants. Of the 140 Kurile Islands, only twenty-one belong to Russia, the rest to Japan.

2. TURKEY IN ASIA

Embraces from 284,000 to 320,000 square geographical miles, with an indeterminable population, at most not more than ten to twelve millions. Among them are about four millions of Turks, two millions of Greeks, one million and a half of Armenians, one million and a half of Turcomans, one million of Arabians, one million of Kurds, one million and a half of Maronites, 300,000 Jews, &c. The following provinces are usually distinguished: 1. Natolia or Anadoli, the ancient Asia Minor, 128,000 square geographical miles, divided into six eyalets. 2. Armenia, 36,320 square geographical miles, divided into four eyalets. 3. Koordistan. 4. Mesopotamia or Dschesair, with Irak, Arabia, the ancient Babylonia and Chaldæa, divided into four eyalets. 5. Syria or Soristan, 32,000 square geographical miles, with about 1,360,000 inhabitants, and five eyalets. The names of all these eyalets will be found on *Plate 26*. To the above provinces must be added: 6. The Turkish Islands, of which Cyprus, with about 4849 square geographical miles, and 100,000 inhabitants, is largest. The most considerable of the other islands are: Rhodes, 320 square geographical miles, pop. 10-30,000; Chios, Samos, Tenedos, Lesbos, and the nine Prince's Islands in the Sea of Marmora.

3. PERSIA (WEST IRAN).

This state lies between 44° and 52° E. longitude from Greenwich (62° to 79° east of Ferro), and between 27° and 40° N. lat. It embraces an area of 368,000 square geographical miles, with about eleven millions of inhabitants, among which, in addition to the Persians proper, are Parsees or Guebers, Koords, Armenians, &c. The national religion is the Schiite-Mohammedan. The supreme head of the state is called Shah (Nasreddin since 1848, of the ruling family of the Turcoman Kadschars), the throne is

nereditary in the male line. The kingdom is divided into twelve provinces :
 1. Irak Adschemi, the ancient Media, with the capital and royal residence, Teheran, and the ancient Ispahan. 2. Farsistan or Fars, Persia proper, with the capital Shiraz. 3. Laristan. 4. Kerman or Karamania, the eastern province, cap. Ravamania. 5. Schusistan or Chusistan. 6. Adzerbeidschan, with the cap. Tauris or Tabriz. 7. Ghilan. 8. Masanderan, the ancient Hyrcania. 9. Taberistan. 10. Kuhistan. 11. Chorasán. 12. Koordistan.

4. ARABIA.

Arabia is separated from Africa by the Red Sea or the Gulf of Arabia, and connected to it by the Isthmus of Suez, has an area of 720,000 square geographical miles, to a population of twelve millions. The greater part of these consist of Arabians, although there are also Turks, Turcomans, Armenians, Banians (Indian merchants), Jews, Negroes, and Abyssinians. The prevailing religion is that of Islam, which here had its origin ; the prevailing sect is the Sunnitic ; only in the interior do we find numerous Wechabites. It is only the inhabitants of the coast, divided into Hedesi (dwellers in towns and villages) and Mædi (a semi-nomadic people), who pay any attention to agriculture, manufactures, and commerce (the latter is chiefly in the hands of the Banians) ; the Bedouins in the interior wander about with their herds. The Imaum of Muscat is the most powerful of all the numerous petty princes. The following districts of unknown extent have received special names : 1. *Hedschas*, the coast land on the northern part of the Gulf of Arabia, over which the Turkish Sultan, as Khalif, exercises a kind of supremacy. The most powerful native prince is the Shereef of Mecca. The most important towns are Mecca, the sacred city of the Mohammedans, where their prophet was born, and Medina, where he was buried. The harbor of Mecca is termed Dschidda ; that of Medina, Yambo. To the extreme north-west of Hedschas lies the peninsula of Petræa, or peninsula of Mount Sinai, with the towns of Akaba and Suez ; it is not usually included under Hedschas. 2. *Yemen*, the south-western part of Arabia, subject in part to the Imaum of Sanna or Sanaa. The chief towns are Sanna, Mocha, and Aden, the latter in possession of England since 1839, and in a high state of prosperity. 3. *Hadramaut*, and 4. *Mahrah*, form the southern coast. The chief towns of the interior are Hadramaut, Schibam, and Terim ; on the coast, Makulla or Markalla. 5. *Oman*, the south-eastern coast from Cape Mussendom to the island of Mazeira, divides into the provinces Dscheilan, Oman, Dhorra, and Batna. The most important towns are Maskat, Rastak, Matarah, and Schohar. 6. *Hadschar*, also called Lahsa or El Ahsa, the coast land along the Persian Gulf, contains the towns of El Katif, Lahsa, and Graine. 7. *Nedschid*, the highland of the interior, is almost entirely unknown. It contains Derreyeh, the chief town of the Wechabites. The greater part of the interior is desert, and forms the so-called Arabia Deserta, including the greater part of the Arabian peninsula.

5. TURKESTAN, TURAN, OR TARTARY.

Turkestan, the home of the Turks, sometimes called Great Bucharia, lies between Russia in Asia, China, Afghanistan, and Persia; it has an area of 512,000 square geographical miles, with a population of five millions. This belongs chiefly to Tartary stocks (Usbeks and Todschiks or Bucharians), besides Turcomans or Truchmenes, Arabians, Kirgises, Kafirs (a Hindoo stock), &c. Excepting the last mentioned, all are Sunnite Mohammedans. Besides the Nomadic tribes in the desert, there are five large states subject to Khans. These are: 1. *Buchara* or *Bokhara*, capitals Samarcand and Bokhara. 2. *Chokand*, north-east of the preceding, with a cap. Chokand. 3. *Khiwa*, in Chowaresm, the northern part of the country, with the land of the Kourates or Aralian Tartars. 4. *Kunduz*, and 5. *Balkh*, with capitals of similar names. We must add to the above the Turcoman land between the Caspian and Aral seas; the land of Buret, the true home of the Kirgises, and the territory of the great Orda of the Kirgises.

6. AFGHANISTAN OR KABULISTAN.

Afghanistan, area 192–256,000 square geographical miles, pop. ten to fourteen millions, constitutes, with Beludchistan, the eastern part of the Iranian plateau, and until 1847 belonged to Persia. The inhabitants belong to very different tribes; the Afghans or Patans, introduced as conquerors, amounted to four millions and a half, in two principal stocks, Gildschis and Duranis; Tadschiks or Persians, the original inhabitants, two millions and a half; Hendkis, of Indian origin, three millions; Eimaks and Hasarehs; also Turkomans, Arabians, Armenians, Abyssinian slaves, Jews, &c. The most powerful princes are the Shah of Kabul, and the Shah of Herat.

The proper Afghan country includes eleven provinces: Tschotsch, Lagman, Pischawer, Dschellalabad, Hasareh, Liwi, Schirkarpur, Kandahar (its capital, one of the most beautiful towns in Asia), Gasni or Ghisni, and Furrah, all with capitals of the same names.

In Khorasan, once a Persian portion of the country, we find Herat, with 100,000 inhabitants, one of the largest and most important places of trade in Southern Asia. Additional provinces reckoned by many geographers under Afghanistan, are the renowned vale of Cashmere (subject to a Maharadscha), and the province of Mooltan.

7. BELUDCHISTAN.

This country, situated to the south of Afghanistan, has an area of from 96–112,000 square geographical miles, with a population of two to three millions. This belongs chiefly to the two races of the Beluds and Brahus, both a pastoral people, and the latter subdivisible into seventy-four stocks.

Six provinces are usually distinguished : Sarawan, cap. Kelat ; Katsch-Gandawa, cap. Gandawa ; Djhalawan, cap. Zuhri ; Lus, cap. Bela ; Mekran, cap. Kedsch or Kedsche ; Kuhistan, cap. Buhra.

8. CHINESE EMPIRE.

This immense empire, which ranks with the Russian and English, as the largest on earth, extends from 69° to 115° longitude east of Greenwich (86° to 162° E. of Ferro), and from 20° to 50° N. lat. Its greatest length is 3450 miles, its greatest breadth amounts to 2484 miles, and with the tributary and vassal countries, embraces an area of 4,000,000 square geographical miles. Of this amount only one third belongs to China proper. The number of inhabitants can be only approximately ascertained, the estimates varying from 150 to 360 millions ; at any rate, this empire exceeds all others in point of population. In addition to the true Chinese, forming the great majority of the population, we find in China proper, Mantchous, various Mongolian tribes, and Jews. The three acknowledged religions are those of Kon-fu-tse or Confucius (religion of the educated), of Fo (Court religion), and of Lao-tse (the oldest religion of the people). The form of government is an unlimited monarchy. The present Emperor is called Ee Lunz, or Yhi Chiu ; his reign dates from the beginning of 1850. The empire consists of directly subject, tributary, and vassal or protected lands.

I. *Lands immediately subject to China.* a. China proper, or Schina, is divided into seventeen provinces. These from north to south are as follows :

1. Tschile or Petscheli, pop. twenty-eight millions, cap. Peking, with about two millions of inhabitants : it is capital of the whole kingdom.
2. Schantung, pop. twenty-nine millions, cap. Tsinansu.
3. Kiangsu, pop. thirty-eight millions, and 4. Anhoei, pop. thirty-four millions ; cap. Kiangningfu or Nankin, with 500,000 inhabitants.
5. Tschekiang, pop. twenty-five millions, cap. Kangtscheufu : Ningpo, with 500,000 inhabitants.
6. Fukian, pop. fifteen millions, cap. Futschewfu, with 400,000 inhabitants.
7. Kwangtung, pop. nineteen millions, cap. Kwangtschufu or Canton, with 500,000 inhabitants. In the vicinity of Canton are situated the Portuguese island of Macao, and the English island of Hongkong.
8. Schansi, pop. ten millions, cap. Tajuan.
9. Schensi, and 10. Kansu, together, with a pop. of fourteen millions, and one cap. Singan.
11. Szetschuan, pop. twenty-one millions and a half, cap. Tschingtu.
12. Lünnan, pop. five millions and a half, cap. of same name.
13. Kwangsi, pop. 700,000, cap. Kweilin. In the interior are the provinces :
14. Hunan, pop. eighteen millions and a half, cap. Tschangscha.
15. Kiangsi, pop. thirty millions, cap. Nantschang.
16. Hupi, pop. twenty-seven millions, cap. Wutschang.
17. Honan, pop. twenty-three millions, cap. Kaiting or Kaifangfu. In addition to these, the islands of Formosa and Hainan belong to China.

b. Thian-Schan-Pelu (or the Dsungarei), and Thian-Schan-Nanlu (High Tartary or Little Bucharia), both together called Sin-Kiang

or the new limits. The most important towns are Ili or Guldja, Yarkand, and Kaschgar.

II. *Tributary Provinces.* 1. Mandschury, also called Tungusia or the Amurland, in the north of China proper, area 480 to 560,000 square geographical miles, pop. two millions, cap. Mukden. 2. Mongoly, area from 90 to 100,000 square geographical miles, inhabited by about three millions of nomadic tribes, subject to twenty-six princes. The town of Urga is situated in the north, and Dschehol in the south.

III. *Lands under the protection of China.* 1. Butan or Bhotan, also included under the East Indies, area about 48,000 square geographical miles, pop. one million and a half, cap. Tassisudon. 2. Tübet or Thibet, area about 400,000 square geographical miles, cap. Hlassa, the residence of the Dalai Lama, or the high priest, and at the same time temporal ruler. 3. Peninsula of Korea or Tschao-Sian, area 112,000 square geographical miles. The king resides in Kinkitao. 4. The thirty-six Lukeio Islands, area 6880 square geographical miles, with 300,000 inhabitants; also the eleven Madschico Islands south-west of the latter.

9. JAPAN.

This island-state on the eastern coast of Asia, embraces an area of 192 to 208,000 square geographical miles, with about twenty to thirty millions of inhabitants. These are about equal to the Chinese in intellectual development; they are of Mongolian descent, and are divided into eight different classes. The national religion is that of Budha, in eight different sects, all recognised by the state. The supreme ruler has for title Dairi. His, however, is only a spiritual supremacy; the Seogoun or Kubo governs in his name, with two hundred princes subject to him. The entire state is divided into eight provinces, sixty-eight circles, and 622 districts. The principal islands are as follows:

1. Nipon, about 80,000 square geographical miles, situated in the centre. The capital, Dscheddo, is said to have 1,600,000 inhabitants; Miako, the residence of the Dairi, is not much smaller. 2. Kiusju or Schimo, area 20,800 square geographical miles, with its capital Nangasaki, where the business of the Dutch Company is carried on: their factory is on the small island of Desima. 3. Sikok, south of Nipon, 12,800 square geographical miles, cap. Awa. 4. Jesso, north of Nipon, 46,400 square geographical miles, cap. Matsmai, with 50,000 inhabitants. In addition to these, most of the Kurile Islands belong to Japan.

10. HINDOSTAN OR HITHER INDIA.

Hindustan, or the western peninsula of the East Indies, this side of the Ganges, embraces about 1,120,000 square geographical miles, and is divided by physical features into four essentially different portions: 1, the Alpine

land on the southern slope of the Himalaya ; 2, the lowland of the Ganges or Hindostan proper ; 3, the lowland of the Indus ; and 4, the peninsula of the Deccan. The inhabitants, about 150 millions in number, may be divided into Hindoos or natives in four different castes ; the so called Mongols, mostly of Perso-Turkish origin, about fifteen millions ; Afghans, Arabians, 500,000 Parsees or Guebers, Jews and Europeans. The prevailing religion is that of the Brahmins (with three principal gods, Brahma, Vishnu, and Shiwa), to which about 107 millions conform ; there are also about twenty-five millions of Mohammedans, five millions of Sikhs or Namaks, over one million and a half of Christians (600,000 Roman Catholics, 500,000 Episcopalians and Presbyterians, 200,000 Jacobites, 200,000 Thomas-Christians, 50,000 Armenians, &c.), and 50,000 followers of Budha.

The greater portion of the peninsula, or about 960,000 square geographical miles, is in possession of the English, or rather of the British East India Company : most of it, with 110 millions of inhabitants, is directly owned by them, and the rest in their indirect possession. The former is divided into four presidencies.

1. *Calcutta* or *Bengal*, with Assam and Arracan, embraces 96,000 square geographical miles, with sixty millions of inhabitants. The capital (and the cap. of all British India) is Calcutta, with 250,000 inhabitants. 2. *Agra*, 112,000 square geographical miles, pop. twenty-one millions, cap. Allahabad, pop. 20,000. Other towns are Benares, pop. 500,000, Delhi, pop. 300,000, Mirzapur, pop. 200,000, Agra, pop. 100,000. 3. *Madras*, 96,000 square geographical miles, pop. fifteen millions, cap. Madras in the Carnatic, with a pop. of 460,000. Other important towns are Trichinopoly, Tanjore, Masulipatam, Calicut, Cotschin, &c. 4. *Bombay*, 56,000 square geographical miles, pop. six millions and a half, cap. Bombay in the province of Aurungabad, with 160,000 inhabitants. Other important towns are Surat, Punah, and Ahmedabad. Since 1843, the district of Scinde, with 40,000 square geographical miles, and one million of inhabitants (cap. Hyderabad) ; and since 1849, the Punjab (the former kingdom of Lahore or the state of the Sikhs), with 128,000 square geographical miles, and eight millions of inhabitants (cap. Lahore, pop. 80,000), together with the district of Petschauer, have become part of the Indo-British Empire.

The indirect territory of the East India Company, 424,000 square geographical miles of extent, and thirty-eight millions of inhabitants, consists of numerous states of various size. The most important are : 1. The *Kingdom of Hyderabad* or the Deccan, 72,000 square geographical miles, and ten millions of inhabitants, with the cities of Hyderabad, pop. 200,000, and Aurungabad, pop. 60,000. The prince, or Radscha, is called Nizam or Subah. 2. *Nagpur*, 52,800 square geographical miles, pop. three millions, with a cap. of the same name, containing 110,000 inhabitants. 3. The Mahratta state of the *Maharadscha Sindia*, 29,760 square geographical miles, with four millions of inhabitants. 4. *Mysore*, 20,320 square geographical miles, and three millions of inhabitants, with the cities of Mysore and Bangalore. 5. *Aude*, 15,200 square geographical miles, pop. three millions, cap. Lucknow, with 300,000 inhabitants. 6. The *States of the*

Rajpoots, 37,280 square geographical miles, pop. two millions. 7. The *State of Guzerat*, 13,600 square geographical miles, pop. two millions, cap. Baroda, 100,000 inhabitants. 8. *Satarah*, 8000 square geographical miles, pop. one million and a half. 9. The *State of the Holkar*, 8480 square geographical miles, pop. one million and a quarter, cap. Indore. 10. *Travancore*, 6400 square geographical miles, pop. one million, chief towns Travancore and Trivanderam.

The French possessions in India embrace only 400 square geographical miles, with 170,000 inhabitants, and the town of Pondicherry; the Portuguese 628 square geographical miles, with 90,000 inhabitants, and the town of Goa.

There are only two independent states in Hither India: Nepaul, 40,000 square geographical miles, with two millions and a half of inhabitants, cap. Katmandu; and Butan or Bootan, with 48,000 square geographical miles, one million and a half inhabitants, and the cap. Tassisudon. The latter state has also been included in Thibet, and is a vassal province of the Chinese empire.

11. FURTHER INDIA.

Further India, or the eastern peninsula of the East Indies, beyond the Ganges, embraces about 640,000 square geographical miles, with thirty-six millions of inhabitants. These consist of Burmans, Siamese, Malays, &c.; most of them speak the Malay tongue, and profess the religion of Budha. The principal states and districts are as follows:

1. *Burmah* or *Ava*, 192,000 square geographical miles, pop. four millions and a half (other accounts vary between two and fourteen millions), cap. Ava; larger towns are Amerapura and Rangoon. 2. *Siam*, about 144,000 square geographical miles, with three millions and a half of inhabitants, cap. Bangkok, pop. 90,000. 3. *Anam*, consisting of the districts of Cochin China and Tonquin, 208,000 square geographical miles, with twelve millions of inhabitants. The royal residence is Hue-Fo in Cochin China; other important towns are Ketcho in Tonquin, and Saygun in Cambodscha. 4. The *Peninsula of Malacca* contains several small independent states. 3. The *British Possessions*, belonging to the presidency of Bengal, are: *a*, *Assam*, subjected since 1825, 32,000 square geographical miles, pop. one million; *b*, *Provinces taken from the Burmans*, viz. Arracan, Martaban, Ye, Tavay, and Tenasserim, in all 27,200 square geographical miles, with 250,000 inhabitants; *c*, *Prince of Wales Island*, one of the Mergui islands, 128 square geographical miles, pop. 61,000; cap. Georgetown, with 20,000 inhabitants; *e*, *Island of Singapore*, south of Malacca, 240 square geographical miles, pop. 21,000.

12. THE EAST INDIA ISLANDS.

1. The *Laccadives*, west of Hindostan, thirty-two inhabited. 2. The *Maldives*, south of the preceding: their number amounts to over one

thousand; only fifty, however, are inhabited by 200,000 Malays under a Sultan. 3. The *English Island of Ceylon*, 20,000 square geographical miles, pop. one million and a half, cap. Colombo, with 50,000 inhabitants. 4. The *Andamans*, in the Bay of Bengal. 5. The *Nicobar Islands*, south of the preceding. The Danish settlements on these islands have been long since abandoned. 6. The *Great Sunda Islands*: *a.* Sumatra, 112 to 128,000 square geographical miles, inhabitants mostly Malays. The Netherlands are in possession of the most of the south-eastern and south-western coast. Chief towns: Padang, Bencoolen, Palembang. *b.* Java, 40,000 square geographical miles, pop. five millions. The greater part of the island in possession of the Hollanders. Chief towns: Batavia, pop. 50,000; Samarang, pop. 30,000; Surabaya, pop. 80,000. *c.* Borneo, the largest island of Asia, 160,000 square geographical miles, with about three millions of inhabitants. A small portion of the island is in possession of the Hollanders. *d.* Celebes, 41,600 square geographical miles, pop. three millions. A tract of 3680 square geographical miles, with 360,000 inhabitants, belongs to the Netherlands. 7. The *Small Sunda Islands*, extending eastwards from Java. The most important are Timor, 6400 square geographical miles, and Sunbava, but little less, both belonging to the Netherlands, excepting a small portion of Timor, which is Portuguese. 8. The *Moluccas* or *Spice Islands*, the easternmost East India islands between Celebes and the small Sunda Isles. They form three groups: the Moluccas proper in the north, the largest Dschilolo, but the best known Ternate: the Amboina group in the middle, the largest of which are Ceram and Buru, but Amboina the most important, and the Banda group. Four islands of the latter, with 44,000 inhabitants, with a portion of the other islands, are in possession of the Hollanders. 9. The *Philippines*, over one thousand in number, mostly small, and in possession of Spain. The largest and most important is Manilla or Luzon, 40,000 square geographical miles, with one and a half to two millions and a half of inhabitants, cap. Manilla. The most southern island is Magindanao or Mindanao, over 16,000 square geographical miles, with nearly one million of inhabitants. The western part of the island only, with the fortress of Zamboanga, is Spanish. The most important of the remaining islands are Mindoro, Panay, Negros, Leyte, and Samar. To the north of Manilla lie the Babuyan and the Baschi Islands. 10. The *Sulu Islands*, with the Island of Galawan, between Borneo and the Philippines.

III. AFRICA (*Plate 29*).

This, the least known of all the great continents, possesses an area of 8,480,000 square geographical miles, or 11,236,900 square statute miles. Its length amounts to 4968 statute miles, and its breadth to 4692 statute miles. Only an approximate estimate can be formed of the population, as the interior is almost entirely unknown. Most geographers give one hundred to one hundred and twenty millions as the number of inhabitants, but this must be considered as a very vague statement, without much veritable

foundation. The aboriginal inhabitants consist of two stocks, the Negroes in the south, and the Caucasian Berbers (Cabyles, Copts, Nubians) in the north. Between the two in the north and east are interposed the Arabians and their posterity the Moors, who have penetrated from Asia. The great majority of the inhabitants are Heathens.

North Africa contains the following lands proceeding from east to west.

1. EGYPT.

This land, interesting in so many respects, is situated on both banks of the Nile, and embraces about 128,000 square geographical miles, with two millions and a half of inhabitants. These are mostly Arabians, and either Fellahs (tillers of the soil, 1,800,000 in number) or nomadic tribes, amounting to 200,000; next to these come the Copts (150,000). There are also the Barabras allied to the Berbers, in the south, some 15,000 Turks, 3500 Jews, &c. The prevailing religion is the Mohammedan, although the Copts profess Christianity. Egypt was a Turkish province since 1517, but now merely acknowledges the supremacy of the Porte, the Viceroy (since 1848, Abbas Pasha, grandson of Mehemet Ali) being almost entirely independent. Three principal districts of Egypt were recognised in the older geographical arrangement: 1. *Lower Egypt*, Bahri, or the northern part as far as the delta of the Nile. This portion contains the celebrated city of Alexandria, now with about 60,000 inhabitants. 2. *Middle Egypt*, Westani. This includes Cairo or Cahira, the residence of the Pasha, with 200,000 inhabitants. 3. *Upper Egypt*, Said, the southern part. The most important town is Siut, with 15,000 inhabitants.

To the east of the Nile valley or Egypt proper, are situated the harbors of Suez and Cosseir. Between Egypt and Tripoli is situated the Libyan desert or the Desert of Barca; and in this, the Oasis of Siwah with the town of the same name.

2. BARBARY.

This, in its most extensive sense, includes the whole coast of Africa lying to the west of Egypt, a strip of about 560,000 square geographical miles, inhabited by twelve to fifteen millions of inhabitants. These are principally Moors, Arabians (Bedouins), and Berbers or Cabyles.

a. Tripoli, area 144,000 square geographical miles, pop. 650,000, has been a Turkish province since 1835. The capital, Tripoli, has about 20,000 inhabitants. Dependencies of Tripoli are the Oases of Fezzan (70,000 inhabitants) and Augila, as likewise the district of Barca.

b. Tunis, 48 to 64,000 square geographical miles, with about two millions of inhabitants, is subject to a Bey, who is almost entirely independent of the Porte. The capital, Tunis, has 100,000 inhabitants. Other important towns are Kairwan, Gabes or Cables, Monastir, Sfar, &c.

c. Algiers, with 67,200 square geographical miles, and a pop. of 1,600,000 (among them at least 150,000 Europeans), has been a French colony since 1838, ruled by a military governor. The immediate territory of the French, which, besides the towns, includes only their immediate vicinity, is divided into the three divisions of Algiers, Oran, and Constantine. The capital is Algiers, with about 100,000 inhabitants. Next to this, the most important towns are: Constantine, Oran, Bona, Philippeville, Budschia, Blidah, Medeah, &c.

d. Empire of Fez and Morocco, 224,000 square geographical miles, and six to eight millions of inhabitants. These are composed mainly of Moors and Arabs, and Amazirghes, or descendants of the aboriginal inhabitants (divided into Berbers and Schellus); there are also 500,000 Jews, and 120,000 Negroes. The empire is subject to an entirely independent Sultan (at present Muley Abderrahman), and is divided into the kingdoms of Fez and Morocco. The capital of Fez is the town Fez, with 80,000 inhabitants: other towns are Mekines, Tetuan, Tangiers, &c. The capital of Morocco is Morocco, with 30,000 inhabitants; other towns are Tarudant, Mogadore, &c. To these must be added the district of Tafilet.

The coast towns of Ceuta, Peñon de Velez, and Alhucemas, belong to Spain.

3. THE SAHARA.

By Sahara (Desert) is to be understood that extensive African lowland which, with the exception of the lands already referred to, and Nubia, includes the whole of Northern Africa, to the amount of about 1,280,000 square geographical miles. The western portion, termed Sahel, is the most desolate, the eastern including numerous Oases. The most extensive of these are: *In the East*: the Little Oasis El Wah, only ninety miles from the Nile; the Middle Oasis, Takel; the great Oasis south of the first, with the town of El Karjeh; the Oasis of Darfu, the largest of all, with numerous inhabitants under a Sultan. 2. *In the North*: the Oasis Siwah (Oasis of Jupiter Ammon), Augila, and Tessan or Fezzan, with the town of Mursuk. The strip of land between the Atlas and the Desert is termed Biledulgerid, or the Land of Dates.

4. NUBIA.

Nubia extends along the Gulf of Arabia in a straight direction from north to south for more than 800 statute miles; since 1822 it has been under the dominion of the Pashas of Egypt. The inhabitants are partly true Nubians or Barabras in three branches, partly Negroes, and partly Arabs; all, however, are Mohammedans. The southern part of Nubia is termed Sennaar, area about 80,000 square geographical miles, and pop. one million and a half, cap. Sennaar. North of this is the land of Schendy, and to the west the Oasis of Cordofan, with the cap. Obeid.

5. HABESCH, OR ABYSSINIA.

This country lies to the south-east of Nubia, and is inhabited by Abyssinians, Schangallas, Gallas, Schihos, Danakils, &c. The prevailing religion is Coptic Christianity, though of a very degenerate character. The whole land formerly constituted a single state, governed by a Negus: at present it is divided into several single states, which exhibit a merely nominal recognition of the Negus as head. The largest of these states are: 1. *Tigre*, ruled by the Ubie who resides in Antalo. 2. *Amhara* or Gondar in the west, under the Negus or Ras Ali, cap. Gondar. 3. *Schoa*, with Efat in the south, under the Sehla Selsasse, who resides in Angololla. Chief town, Ancobar. Eastward of Schoa lies the land of Hurrur, with the cap. of same name.

6. THE WEST COAST.

This entire coast, from the Sahara to Cape Negro, is inhabited by Negroes, divided into innumerable tribes. It is divisible into three great sections: Senegambia, Upper Guinea, and Lower Guinea.

a. Senegambia: from 16° N. to 10° S. lat., deriving its name from the two rivers Senegal and Gambia, is divided into a vast number of small negro states. The most numerous tribes are the Fulahs, the Mandingos, the Dschaloffs and Felups, the Biafars, &c. The following European nations have settlements on this coast: 1. The *French*: Islands of St. Lous, Goree, &c. 2. The *English* (under the government of Sierra Leone); St. James's Island, St. Mary, Macarthy, Bulama. 3. The *Portuguese*: St. Cacheo or Cacheu, Farim, Geba, Island of Bissao.

b. Upper or North Guinea is divided from east to west into the following districts: 1. *District of Sierra Leone*. 2. *Coast of Malaghetta* or grain coast; to this belongs the Republic of Liberia (colony of emancipated negroes from the United States), cap. Monrovia, as also the Kroo, Sanguin, and other lands. 3. *Ivory Coast*. 4. *Gold Coast*, the best known part of Guinea, with the most powerful negro nation of this region, the Ashantees, amounting to from one to two millions of souls. Their chief town is Kumassi. 5. *Slave Coast*, with Dahomey, chief town Abomey. 6. *Coast of Benin*, a peninsula, with the important negro kingdom of Benin.

The European settlements of North Guinea are: 1. *English*: the government of Sierra Leone, to which all slaves captured in slavers by the English are taken, cap. Freetown; on the Gold Coast, the forts, Apollonia, Dixcove, Commenda, Cape Coast Castle, Annamabu, Winnebah, and Prambran (indicated on our map, *Plate 29*, by the numbers 1, 3, 4, 6, 7, 9, 11, in order); James's Castle, with the negro town Akkra (No. 10). 2. *French*: the factories Grand Bassan on the Ivory Coast, and Assinie on the Gold Coast. 3. *Netherlands*: forts Antonius, Elmina or St. George de la Mina, Tantam (given on the map by the numbers, 2, 5, 8), Hollandia, Crevecoeur, near Akkra, Sebastian, St. Iago, &c., all on the Gold Coast.

4. *Danish* : forts Akkra (No. 10), Quita (No. 12), Christiansburg, Friedensburg, and others, on the Gold Coast ; Prinzenstein on the Slave Coast.

c. *Lower* or *South Guinea*, separated from Upper Guinea by the Ambos highlands, and partly under the supremacy of the Portuguese (300,000 subjects), contains the following independent negro kingdoms : 1. *Loango*, cap. of same name ; subject to it is the kingdom of Cakongo. 2. *Congo*, to the south of the preceding, with the town of San Salvador or Congo. Under Portuguese dominion, are : 3, *Angola*, with the town of S. Paolo de Loando, and 4, *Benguela*, with the Portuguese town of the same name : in the interior is the town of Matamba.

7. SOUDAN.

By this is to be understood an indefinite extent of country in the interior of Middle Africa, bounded on the north by the Sahara, east by Darfur, west by Senegambia and Upper Guinea, and south by the inner highlands. The area of this little known country (entirely unexplored in the eastern part) amounts at least to from 640 to 800,000 square geographical miles. The low northern part is called Low Soudan or Nigritia. The district of Haussa divides it into a western and eastern portion, the former of which contains the basin of the Niger or Quarra (termed Dscholliba in its upper part), the latter that of Lake Tschad. The inhabitants are negroes, as far as known ; amongst them the most advanced in civilization are the Haussans. The principal kingdoms, as far as known, are : 1. *Bornu*, probable pop. five millions ; chief town, New Birnie, not far from Lake Tschad. 2. *Haussa*, or the kingdom of the Fellatahs ; chief town, Sakkatu. 3. *Mandara*, south of Bornu ; chief town, Mora. 4. *Yarriba*, cap. Katunga or Eyeo. 5. *Borgu*, cap. Bussa. 6. *Yauro*, cap. Yauri. 7. *Timbuctoo*, cap. Timbuctoo, an important place of trade. 8. *Lower Bambarra*, cap. Inne or Dschenne. 9. *Upper Bambara*, cap. Sago or Segu. The more elevated portion of Soudan to the north of North Guinea, is called High Soudan.

8. THE EAST COAST.

This coast, 3680 statute miles long, from Cape Guardafui to Delagoa Bay, or from 12° N. lat. to 25½° S. lat., is still but very little known. The inhabitants are mainly negroes, but in the north we find Arab tribes. The only European settlements are those of the Portuguese, who have had a footing for more than three hundred years. The subdivisions of the country are from north to south as follows : 1. *Ajan*, or the deserts of the Somalis and Sowalis, mostly desert, and inhabited by Arab and Galla tribes. Towns, Mukdischa, Magadoxo, Brava, Melinde. 2. *Zanguebar* or *Zanzibar*, from the river Quilimanci to the river Mongallo, on Cape Delgado ; cities, Mombaca, Lamu. Here belong the islands of Pemba and Zanguebar, on the latter of which resides the Imaum of Muscat. 3. *Mozambique*, from

the Mongollo to the Zambese ; the city and island of Mozambique form the seat of the Portuguese government of the east coast. Islands are Oibo, Querimba (both with Portuguese settlements), Angora, Fuego, and St. Quillimane. Not far from the coast reside the Makuas, a rude negro race.

4. Coast lands of *Sena*, *Sofala*, *Sabia*, and *Inhambare*. In the interior are situated the negro states of Monomotapa (cap. Zimbaoe) and Iambara ; and on the coast, the Portuguese settlements of Inhambane, Sena, Tete, Zumbo, and Manica.

Between Cape Guardafui and the Straits of Bab-el-Mandeb, lies the coast of Adel, with the districts of Zeile and Berbera.

9. THE HIGHLANDS OF AFRICA,

Which in all probability include the interior of the whole of South Africa, are almost entirely unknown, with the exception of the southern portion. The inhabitants are negroes, amongst which are usually distinguished four main stocks : the Schaggas, Gallas, Caffirs, and Hottentots. The Bechuanas of Orange River belong to the Caffirs, who likewise inhabit a portion of the east coast. The Hottentots, among which belong the Bosjemins or Bushmen, dwell on the Middle and Lower Orange ; some tribes (as the Griquas) have partly embraced Christianity.

10. THE CAPE LAND.

By this is to be understood such of the southern part of Africa as has been penetrated by European settlers. Its area amounts to from 128 to 160,000 square geographical miles, the proper area of the colony to about 112,000 square geographical miles ; the number of inhabitants is 150 to 160,000. The Netherlands possessed this country since 1600, the first settlement being made in 1652 ; their territory was conquered by the English in 1806, in whose hands it still remains. The land is subject to a governor, and is divided into two provinces.

I. The Western Province, divided into seven districts : Cape district, with 40,000 inhabitants ; cap. Cape Town, with 30,000 inhabitants, amongst which are 12,000 Mohammedans and 6,000 Negroes ; Stellenbosch, pop. 18,000 ; Worcester or Tulbagh, and Clanwilliam, pop. 18,000 ; Zwellendam, pop. 17,000 ; George, with 10,000 inhabitants ; and Beaufort.

II. Eastern Province, divided into five districts : Graaf Reynett, pop. 16,000 ; Uitenhage, pop. 12,000 ; Albany, pop. 9000 ; Somerset, pop. 12,000 ; and Adelaide.

11. THE ISLANDS OF AFRICA.

A. ON THE EAST COAST from north to south : *Socotora*, 140 miles from

Cape Guardafui, in possession of the Arabian Emirs of Kissim, cap. Tamerida. 2. The *Sechelles*, or Mahé Islands, thirty in number, English colonies since 1814. The most important are Mahé, Praslin, and La Digue. 3. The *Amirantes* or Admiralty islands, south-west of the preceding, belonging to the Portuguese. 4. *Madagascar*, 168,000 square geographical miles, is unknown as to its interior. The inhabitants, termed Madegassas, although of dark complexion, are not negroes, and possess some advancement in civilization. The island is divided into twenty-two individual states: the most important are north and south Sekelava on the west coast, and Anossy in the interior. The French have established several settlements on the east coast, among them St. Marie, Foulpoint, Nossibè, &c. In the vicinity of the northern point, the English possess the harbor of Loquez or Diego Suarez. 5. The *Comorin*, or *Comoro Islands*, in the northern part of the Mozambique Channel, four in number, the largest, Angazaye or Comoro; the others are called Anjuan, Mehilla, and Mayotta (the latter in possession of the French). 6. The *Mascarene Islands*, Bourbon and Mauritius. The former belongs to France, and has an area of 1760 square geographical miles, with a pop. of 100,000, cap. St. Denis: the latter to England, area 880 square geographical miles, pop. 100,000, cap. Port Louis. 7. The *single islands* of Rodrigues, John of Lisbon, Kerguelen's Land, St. Paul and Amsterdam, &c.

B. ON THE WEST COAST from south to north: 1. *Tristan d'Acunha*, three islands in possession of the English. 2. *St. Helena*, 88 square geographical miles, pop. 5000, belongs to England. 3. *Ascension*, also English. 4. *Guinea Islands*, only 70 to 250 miles from the coast of Guinea; of these, Fernando Po belongs to the English; the Princes Islands and Annobon to the Spanish; St. Thomas to the Portuguese. 5. The *Cape de Verde Islands*, fourteen in number (four of these barren rocks only), in possession of the Portuguese. The largest are San Jago, San Nicholas, S. Vincente, S. Philipp or Fuego, S. Antonio, and S. Juan. 6. The *Canary Islands* (see page 53). 7. The *Madeiras*, of which Madeira, 256-320 square geographical miles, and pop. 100,000, is solely of importance. It is in possession of the Portuguese. The capital, Funchal, has 20,000 inhabitants. The northern islands of Porto Santo and Salvages likewise belong to Portugal.

IV. AMERICA (*Plate 30, 31*).

The great western continent extends in a north and south direction from 71° 20' N. to 54° 30' S. lat., its extreme length from the Straits of Magellan to Behring's Strait being 10,500 statute miles. The entire area may be estimated at 14,950,000 square statute miles.

It is divided by the Isthmus of Panama into two large triangles, North and South America, between which lies a large chain of islands. The inhabitants are partly of aboriginal origin (Indians and Esquimaux), and partly introduced (Europeans and Africans, with their descendants). The

population amounts to over fifty millions. The prevailing religion of North America is the Protestant; that of Central and South America, Catholic. In addition to these, there are numerous tribes in both Americas, which have not embraced any form of Christianity.

A. NORTH AMERICA.

1. CONTINENTAL AND INSULAR REGION OF THE NORTH POLE.

a. Lands to the west of Baffin's Bay. On the west side of Baffin's Bay is situated Baffin's Land, consisting of one or more islands (called Cockburn Island in the north, and Cumberland Island in the south), to the west of which is Melville Peninsula. North of Barrow's Straits lies the land of North Devon; west of it, the North Georgian Islands, Cornwallis, Bathurst, Byam Martin, Sabine, and Melville; to the south of the first and last respectively, lie North Somerset, whose southern part is called Boothia Felix, and Banks Land.

b. Greenland, to the east of Baffin's Bay, is probably an island, and is inhabited by copper-colored Esquimaux. The Danes have settlements on the west coast (New Greenland), embracing from 20–25,000 inhabitants, and divided into a north and a south Inspectorate, with about 9000 Christian inhabitants. The southern and most thickly populated place is Julianenhab, with 16,000 inhabitants; the oldest is Goodshaab, the most northern Upernavik. Disco is the largest of all the numerous islands on the west coast. The east coast, discovered in 982, was almost inaccessible for nearly one hundred years previous to 1822, owing to numerous icebergs.

c. Spitzbergen, the most northern land known (extending to 81° N. L.), consists of three large, and several smaller islands, all together possessing an area of 22,400 square geographical miles. It is uninhabited, save by a few Russians in summer, who carry on fishing and hunting for several months in the year.

2. THE HUDSON'S BAY TERRITORY AND RUSSIAN POSSESSIONS.

The territory embraced under this head, and lying between the Atlantic and the Pacific Oceans, covers an area of over 3,570,000 square statute miles. Individual portions are: 1. Labrador and East Main, together constituting a peninsula between Hudson's Bay and the Atlantic. 2. New Wales or West Main, called New North Wales in the north, and New South Wales in the south, situated south and west of Hudson's Bay. 3. Along the Pacific from north to south, New Norfolk, New Cornwall, New Hanover, New Georgia. The whole country has been termed New Britain. All the region north of 60° N. lat., and west of the meridian of 141° W. longitude from Greenwich, belongs to Russia, the territories of the United States beginning with the parallel of 49° N. lat. in the western

region. The most important point in Russian America is the settlement of New Archangel on the island of Sitka. The British territory embraces 278,816 square geographical miles, with about 2,500,000 inhabitants, and is divided into twenty districts, although the only settlements are those in the vicinity of the scattered forts and factories of the Hudson's Bay Company.

3. BRITISH NORTH AMERICA.

In addition to New Britain just referred to, the following territories of North America belong to Great Britain, amounting to 327,424 square geographical miles, with 1,620,000 inhabitants.

1. *Canada*, with 347,812 square statute miles, and 1,165,000 inhabitants, is divided into Lower and Upper Canada, or Canada East and Canada West. About 30,000 of the inhabitants are descended from the Aborigines of the country, the rest are of European origin (French, English, Scotch, &c.) The majority of the inhabitants of Lower Canada are of French extraction, and profess the Catholic religion. The Governor of Canada, who is at the same time Governor General of all British America, shares the government with a parliament composed of a legislative council and a house of assembly. The most important towns are, in Lower Canada: Montreal (former capital), pop. 40,000, and Quebec with 40,000; in Upper Canada, Toronto (present capital), with 11,000, and Kingston with 12,000. The present Governor of Canada and Captain General of all the British Provinces of North America is Lord Elgin. 2. *New Brunswick*, 27,700 square statute miles, pop. 156,000 (mostly English), situated to the east of Lower Canada, capital Fredericton, with 5000 inhabitants. St. John's, the chief place of trade, has 15,000 inhabitants. Present Lieutenant Governor, Sir W. Colebrooke. 3. *Nova Scotia and Cape Breton*, both together of 17,500 square statute miles in area, with 200,000 inhabitants; capital Halifax, with 20,000 inhabitants. Pictou and Sidney are important towns. Sir John Harvey, Lieutenant Governor. 4. *Prince Edward's Island*, area 2134 square statute miles, pop. 34,666, capital Charlottetown, Lieutenant Governor, H. V. Huntley. 5. *Newfoundland*, separated from Labrador by the Straits of Belleisle, area 35,913 square statute miles, pop. 90,000, of mixed French and English descent, capital St. John's. The large island of Anticosti, in the Gulf of St. Lawrence, belongs here. The neighboring islands of St. Pierre and Miquelon, with 2000 inhabitants, belong to France. 6. The *Bermuda Islands*, situated nearly 500 miles from the coast, amount in number to about 400, of which only five are inhabited, namely St. George (cap. Georgetown), Bermuda, St. David, Ireland, and Somerset.

4. THE UNITED STATES OF AMERICA.

The vast territory belonging to the United States is included between the parallels of 25° and 49° N. lat., and the meridians of 67° and 125° of

longitude west of Greenwich. It is bounded on the north by British America, on the east by the Atlantic Ocean, on the west by the Pacific, and on the south by the State and Gulf of Mexico. Its area amounts to 3,260,073 square statute miles, of which 1,570,916 belong to thirty states, the thirty-first state, or California, being included in the estimate for territories. Some authorities allow 2,187,496 square miles to the territories; this, however, includes the whole of Texas as claimed by her.

The population of the United States, as ascertained by the census of 1840, amounted to 17,063,353; the census of 1850 will probably exhibit an aggregate of over twenty-one millions. The number of slaves, in 1840, amounted to 2,009,031; of free negroes, to 386,235. The densest population is found in Massachusetts, Rhode Island, and New York. The great majority of the inhabitants are whites, principally of English descent or Anglo-American; the English is the prevailing language; next to this the German is most in use, being spoken by over five millions of people. The aboriginal inhabitants are fast melting away, their number, according to some estimates, amounting only to 200,000, and at any rate not exceeding half a million. The largest denomination (as regards actual communicants) is the Roman Catholic, which embraces 1,191,000 communicants; next comes the Methodist Episcopal Church with 1,112,756 communicants, the Baptists with 686,807, the Presbyterians (old and new school) with 339,877, the Lutheran with 163,000, the Congregational with 197,196, the Protestant Episcopal with 67,550, the Dutch and German Reformed with 102,840, &c. The proportion is somewhat different as regards simple profession of faith.

According to the constitution of 1787, the United States form a confederacy, at the head of which stands a president (now Millard Fillmore) elected for four years, and a congress. This congress consists of a senate and a house of representatives, which must assemble at least once a year, unless otherwise provided by law. The senate is composed of two members from each state, the present number being sixty-two. They are chosen by the legislatures of the several states, for the term of six years. The Vice-President of the United States is the President of the Senate, in which he has only a casting vote. The house of representatives is composed of members elected by the people of the several states for the period of two years. The thirty-first congress is chosen according to the apportionment of 1842, the ratio being one representative for every 70,680 persons in each state. The present number of representatives is 231, and there are two delegates, one from Minnesota and the other from Oregon, who have a right to speak but not to vote. The compensation of each member of congress is eight dollars per day, when in attendance in congress: in addition to this, he receives eight dollars for every twenty miles of travel in going to or returning from the seat of government.

The governments of the individual states, although exhibiting slight variations among each other, are modelled closely on the system of the general government, namely a governor and a legislature, the latter composed of a senate and assembly.

a. THE INDIVIDUAL STATES.

In the following table of statistics, the population, unless otherwise expressed, is given according to the census of 1840 :

1. Maine (since 1820), 32,400 square statute miles, with 501,793 inhabitants, capital Augusta.
2. New Hampshire (since 1623), 9500 sq. st. m., with 284,574 inhabs., cap. Concord.
3. Vermont (since 1791), 9700 sq. st. m., with 291,948 inhabs., cap. Montpelier.
4. Massachusetts (since 1628), 7800 sq. st. m., with 737,699 inhabs., cap. Boston, with 114,000 inhabs.
5. Rhode Island (since 1638), 1251 sq. st. m., with 108,830 inhabs., cap. Providence, with 23,000 inhabs., and Newport.
6. Connecticut (since 1635), 4789 sq. st. m., with 309,978 inhabs., cap. Hartford, with 1300 inhabs., and New Haven.
7. New York (since 1614), 46,220 sq. st. m., with 2,428,921 inhabs., cap. Albany with 34,000 inhabs.; the first commercial and most populous city of the whole union is New York, with 370,000 inhabs.
8. New Jersey (since 1624), 7948 sq. st. m., with 373,306 inhabs., cap. Trenton, with 4000 inhabs.
9. Pennsylvania (since 1682), 42,215 sq. st. m., with 1,724,023 inhabs., cap. Harrisburg, with 6000 inhabs.; the second city of the union in population is Philadelphia, with 260,000 inhabs.
10. Delaware (since 1627), 2068 sq. st. m., with 78,085 inhabs., cap. Dover, with 6600 inhabs.
11. Maryland (since 1633), 10,755 sq. st. m., with 470,019 inhabs., cap. Annapolis, with 3000 inhabs.; here belongs the third city of the union, Baltimore, with 134,000 inhabs.
12. Virginia (since 1607), 65,700 sq. st. m., with 1,239,797 inhabs., cap. Richmond, with 20,000 inhabs.
13. North Carolina (since 1650), 51,632 sq. st. m., with 753,419 inhabs., cap. Raleigh, with 2000 inhabs.
14. South Carolina (since 1670), 31,565 sq. st. m., with 594,398 inhabs., cap. Columbia, with 4300 inhabs.
15. Georgia (since 1733), 61,683 sq. st. m., with 691,392 inhabs., cap. Milledgeville.
16. Florida (since 1845), 56,336 sq. st. m., with 54,447 inhabs., cap. Tallahassee.
17. Alabama (since 1819), 54,084 sq. st. m., with 590,756 inhabs., cap. Montgomery.
18. Mississippi (since 1817), 49,356 sq. st. m., with 375,651 inhabs., cap. Jackson.
19. Louisiana (since 1812), 47,413 sq. st. m., with 352,411 inhabs., cap. Baton Rouge.
20. Tennessee (since 1796), 41,752 sq. st. m., with 829,210 inhabs., cap. Nashville.
21. Kentucky (since 1792), 40,023 sq. st. m., with 779,828 inhabs., cap. Frankfort.
22. Ohio (since 1802), 40,500 sq. st. m., with 1,519,464 inhabs., cap. Columbus; far more important is Cincinnati, with more than 100,000 inhabs.
23. Indiana (since 1816), 35,626 sq. st. m., with 685,866 inhabs., cap. Indianapolis.
24. Illinois (since 1818), 56,506 sq. st. m., with 476,183 inhabs., cap. Springfield.
25. Michigan (since 1836), 60,537 sq. st. m., with 212,267 inhabs., cap. Lansing.
26. Missouri (since 1820), 70,050 sq. st. m., with 383,702 inhabs., cap. Jefferson city; the most important city is St. Louis, with 40,000 inhabs.
27. Arkansas (since 1835), 54,617 sq. st. m., with 97,574 inhabs., cap. Arkopolis or Little-Rock.
28. Wisconsin (since 1846), 32,930 sq. st. m., with 30,945 inhabs., cap. Madison.
29. Iowa (since 1845), 173,786 sq. st. m., with 43,112 inhabs., cap. Iowa city.
30. Texas (since

1845; till 1835 a part of Mexico, then 1835–45 an independent republic), cities: Austin, the capital, other towns Bexar, Houston, and Galveston. 31. California (since 1850), cap. not decided upon, inhabs. not precisely ascertained. Principal city, San Francisco.

1. *District of Columbia*, formerly ten miles square, now confined to that part of the square formerly in Maryland, and north of the Potomac, cap. Washington, and at the same time the seat of the general government, pop. 23,000. 2. The *Indian Territory* north of Texas, west of Missouri and Arkansas, and south of the Platte, area 248,851 square statute miles, inhabited by the Delawares, Kansas, Arrapahoes, Shawnees, Osages, Cherokees, Seminoles, &c. 3. *Nebraska*, north of the Platte and of Iowa, and extending to the British line of 49° N. lat., bounded east by the Missouri and west by the Rocky Mountains, inhabited by the Minnetarees, Mandans, Cheyennes, Tetons, Blackfeet, Pawnees, &c., 723,248 square statute miles. 4. *Minnesota*, area 150,000 square statute miles, west of Iowa and Wisconsin, east of the Missouri river, and south of the British line of 49°, inhabited by Winnebagoes, Sioux, &c., and by an increasing population of whites, chief town St. Paul's. 5. *Oregon*, bounded north by the parallel of 49°, south by the parallel of 42°, east by the Rocky Mountains, and west by the Pacific Ocean, inhabited by Clatsops, Wallah Wallahs, Shoshonees, and other tribes of Indians, and by a large and increasing number of persons from the United States, area 341,463 square statute miles. 6. *New California* (recently erected into a state), south of Oregon and north of Mexico, bounded on the east by the Pacific Ocean, and on the west by New Mexico. This country, within the last few years, has been the object of universal attention on account of the vast deposits of gold which it contains, either in the rock or in the alluvial sands. The white population, consisting mainly of individuals from the United States, amounted, on the 1st of January 1850, in all probability, to 100,000. Principal town, San Francisco. 7. *New Mexico*, north-west of Texas, north of Mexico, and east of New California, with an area of 77,128 square statute miles. Principal town Santa Fé, inhabited by predatory bands of Indians, by Mexicans, and Anglo-Americans, the latter increasing rapidly in number.

b. REPUBLIC OF MEXICO.

This great state, to the south of the United States of America, has an area of 1,100,000 square statute miles, with a population of seven to nine millions. Of this, about four sevenths are aboriginal inhabitants, two sevenths a mixed race, and one seventh Europeans or their descendants, mostly of Spanish origin. Slavery is not recognised in this country. The principal language is the Spanish, although many others are in use. The prevailing religion is the Roman Catholic. Although a confederacy, the independence of the individual states as provinces was taken away by the constitution of 1825. These states may be divided into western, eastern, and interior. The western states, represented on the map of North America (*pl.* 30) by the numbers 1, 15, 16, 5, 7, 4, are in this order: Mexico (with the cap. Mexico, pop. 220,000); Puebla (cap. Puebla,

pop. 75,000), with the district Tlascala; Oaxaca (cap. do., pop. 33,000, Xalisco, Cinaloa, with Sonora and Mechoacan. Eastern states, on the map Nos. 18, 12, and 14, are Tabasco, Tamaulipas (cap. Tampico), and Vera Cruz. Interior states, Nos. 2, 3, 6, 8, 9, 10, 11, 13, 17, on our map, are: Queretaro (cap. do., with 20,000 inhabitants); Guanaxato (cap. do., pop. 50,000); Zacatecas (cap. do., pop. 22,000); Cohahuila; New Leon (cap. Monterey, pop. 15,000); San Luis Potosi (cap. do., with 32,000 inhabitants); Chiapa. There are also three territories: Lower California, a peninsula, nearly 700 miles long, Colima, and Tlascala.

The province of Yucatan, of from 42–63,000 square geographical miles, and with 6–700,000 inhabitants, since 1841 has formed an independent free state. The cap. is Merida, with 28,000 inhabitants.

The English possess a settlement on the south-eastern coast of the peninsula of Yucatan, namely Balize or Honduras.

6. FREE STATES OF CENTRAL AMERICA.

These states, situated to the south of Mexico, have an area of 169–190,000 square statute miles, with 5–600,000 white, and about one million and a half of Indian inhabitants. From 1821 to 1823, they formed part of the Mexican confederacy; from the 1st of July, 1823 to 1839, they constituted a separate confederacy, which in 1839 dissolved into the following five independent republics: the four first, however, formed a new confederacy on the 7th October, 1842. 1. Guatemala, area 28,000 square statute miles, with 950,000 inhabitants, cap. New Guatemala, with 55,000 inhabitants. 2. San Salvador, 24,000 square statute miles, pop. 350,000, cap. San Salvador, with 31,000 inhabitants. 3. Nicaragua, area 30,000 square statute miles, pop. 350,000, of which one half are Ladinos (mixture of Whites and Indians), one third Indians, and one sixth Mulattoes and Blacks; cap. Leon, with 59,000 inhabitants. 4. Honduras, 81,000 square statute miles, with from 200–350,000 inhabitants, cap. New Valladolid or Comayagua, pop. 18,000. 5. Costa Rica, or Isthmus of Panama, area 33,000 square statute miles, pop. 180,000; cap. San Jose (da Costa), pop. 20,000.

The eastern part of the peninsula of Honduras is occupied by the Mosquito Indians, who have there a so-called kingdom under the protection of the English, cap. Blewfield.

B. WEST INDIES.

By this is to be understood the numerous chain of islands situated in front of or in the Caribbean Sea, and lying between the parallels of 10° and 27° N. lat. Together they present an area of about 92,800 square statute miles, with a pop. of some three millions, mostly negroes and mulattoes (one million of slaves); about one sixth of the number are whites. With few exceptions they belong to six European powers, as follows:

I. The GREAT ANTILLES, four in number. 1. *Cuba*, 43,380 square

statute miles, pop. one million (one half slaves), in the possession of Spain since 1511; cap. Havanna, with 137,000 inhabitants. 2. *Jamaica*, 5697 square statute miles, pop. 485,000 (of these, in 1837, only 16,000 were whites), is the most important British island. The cap. is Spanish Town, with 5000 inhabitants; the most important place, however, is Kingston, with 33,000. Here belong the two Cayman Islands, the larger of which alone is inhabited. 3. *Haiti*, formerly St. Domingo or Hispaniola, 29,400 square statute miles, pop. 950,000 (among them 500,000 negroes, 420,000 mulattoes, and 30,000 whites), belongs to free negroes and mulattoes, and from 1822–1843 constituted an independent republic, which in the latter year was divided into two: *a*, the Republic of Dominica in the eastern (formerly Spanish) portion of the island, with the cap. San Domingo, and *b*, the Republic of Haiti, in the western (formerly French) end; cap. Port Republican (formerly Port au Prince). The latter republic, since August 29, 1849, has been changed into a monarchy, the President, General Soulouque, having been proclaimed Emperor under the name of Faustin I. 4. *Porto Rico*, 3840 square statute miles, with 280,000 inhabitants (400,000 according to other estimates), amongst them 40,000 slaves. It has been Spanish since 1510; cap. San Juan de Porto Rico, with 10,000 inhabitants.

II. The LESSER ANTILLES, or Caribbean Islands, with an area of about 5275 square statute miles.

a. In possession of England. 1. The *Virgin Islands*, Spanish Town or Virgin Gorda, Tortola, and Anegada, in all 189 square statute miles, with 66,000 inhabitants. 2. *Antigua*, 105 square statute miles, pop. 36,000, cap. St. John's, with 16,000 inhabitants; to this belong the islands Anguilla, pop. 1600; St. Kitt's, pop. 23,000, cap. Basse-Terre; Montserrat, pop. 73,000, cap. Plymouth; Nevis, pop. 9000, cap. Charlestown. 3. *Dominica* or *Dominique*, 273 square statute miles, with 20,000 inhabitants, cap. Roseau. 4. *Barbadoes*, to the east of all the Antilles, 210 square statute miles, pop. 22,000. Next to Jamaica, it is the most important of all the British West Indies; cap. Bridgetown, with 20,000 inhabitants. 5. *St. Lucie*, 220 square statute miles, pop. 21,000, cap. Carenage, with the harbor Port Castries. 6. *St. Vincent*, 126–168 square statute miles, pop. 28,000, cap. Kingston. 7. *Grenada*, 126–168 square statute miles, pop. 29,000; cap. Georgetown, with 10,000 inhabitants. 8. The *Grenadillas*, a small group, 68 square statute miles, pop. 2000. 9. *Tobago*, 126–168 square statute miles, with 13,000 inhabitants, cap. Scarborough. 10. *Trinidad*, 1680 square statute miles, or according to other estimates, 2373 square statute miles, pop. 60,000; cap. Spanish town or Puerto de España.

b. The French possess: 1. *Guadaloupe*, 378–756 square statute miles, pop. 116,000; among them 90,000 slaves. It consists in reality of two islands, separated by an arm of the sea: Grand Terre and Basse-Terre. On the latter is situated the capital of the same name. 2. *Desirade*, 21 square statute miles, with 1300 inhabitants. 3. *Marie Galante*, 84 square statute miles, pop. 12,000. 4. *Les Saintes*, three islands, 126 square statute miles, pop. 1200. 5. *Martinique*, 358 square statute miles, pop. 120,000, cap.

Port Royal, with 10,000 inhabitants; St. Pierre is still larger, with 20,000 inhabitants.

c. The Spanish possess only two of the Virgin Islands, Passage and Culebra Islands, 147 square statute miles, with 4000 inhabitants.

d. Islands of the Netherlands, in all 252 square statute miles, with 20,000 inhabitants. 1. *St. Martin*, pop. 8000: a portion of the island, with 3500 inhabitants, is French. 2. *St. Eustache*, 20-40 square statute miles, with 13,000 inhabitants, cap. St. Eustache. 3. *Saba*, 10 square statute miles, with 3000 inhabitants. 4. *Curassao*, 178 square statute miles, pop. 14,000; cap. Wilhelmstadt.

e. The Danes possess three of the Virgin Isles, 178 square statute miles in all, with 45,000 inhabitants: 1. *St. Croix*; 2, *St. Thomas*; 3, *St. Jean*.

III. The BAHAMAS owned by the English, about 500 in number, of which only two are inhabited. Area of the whole, 4200 to 5250 square statute miles, with a pop. of 25,000. The most important islands are New Providence, 168 square statute miles, pop. 8000, cap. Nassau: Abaco or Lucayo; Bahama Grande, 346 square statute miles, but uninhabited; St. Salvador or Guanahani, also called Cat Island, 336 square statute miles, the first land discovered by Columbus; Turk's Island; Caicos.

C. SOUTH AMERICA (*Plate 31*).

1. THE THREE COLUMBIAN REPUBLICS.

The Republic of Columbia, established in 1819, became separated in 1830 into three smaller republics.

a. *New Grenada*, the north-western part, 380,000 square statute miles, pop. 1,687,000, divided into five departments; the cap. is Santa Fé de Bogota, with 40,000 inhabitants.

b. *Venezuela*, 450,000 square statute miles, divided into thirteen provinces; pop. about one million, of which 300,000 are whites, 480,000 mixed, 48,000 negro slaves, 4000 subjected Indians, 50,000 free do., &c.; cap. Caraccas, with 45,000 inhabitants. Here belongs the West Indian island, La Margarita or Margaretha, 399 square statute miles, with 14-19,000 inhabitants, together with several other smaller islands.

c. *Ecuador* or *Quito*, area 325,000 square statute miles, pop. 325,000, formerly divided into three departments, now into eight provinces; cap. Quito, with 70-80,000 inhabitants.

2. GUYANA OR GUIANA.

By this is to be understood the territory belonging to England, France, and the Netherlands, situated between Venezuela and Brazil, with an area

of 163,800 square statute miles, and a pop. of 250,000 (160,000 negroes), exclusive of the free Indians. Maroon-negroes or runaway slaves are numerous in the forests.

a. British Guiana has an area of 98,700 square statute miles, and a pop. of 100,000, among which 7000 are whites. It is divided into three colonies : Demerara, Essequibo, and Berbice, cap. Georgetown, with 20,000 inhabitants.

b. Netherlands Guyana or Surinam, area 35-37,800 square statute miles, and a pop. of only 70,000 ; of this, 60,000 are slaves ; cap. Paramaribo, with 20,000 inhabitants.

c. French Guiana or Cayenne, 27-29,400 square statute miles, pop. 22,000, of which 15,000 are negro slaves ; cap. Cayenne, on a small island.

3. EMPIRE OF BRAZIL.

The area of this enormous state, the second in point of rank in America, amounts to 2,300,000 square statute miles, and the pop. to 5,200,000, without including the wild Indian tribes. Brazil was a Portuguese territory from the sixteenth century ; from 1815 it was a kingdom ; and since 1822 it has been an independent state, with a representative government, and an emperor. Since 1831, the emperor has been Don Pedro II., of the House of Braganza, brother of the reigning Queen of Portugal. The map exhibits the eighteen provinces into which the empire is divided. The capital city is Rio Janeiro, with 150,000 inhabitants ; next to it, in point of size, come the two towns of Bahia, with 80,000, and Pernambuco, with 60,000 inhabitants.

4. REPUBLIC OF PERU.

With an area of 524,000 square statute miles, this state has a population of 1,374,000 souls. This consists chiefly of Creoles, Mestizoes, Mulattoes, Indians, and Negroes, all of whom, with little exception, profess the Roman Catholic religion. Our map presents the three departments, Lima, Libertad, and Junin ; but recent geographers add four more provinces, Arequipa, Ayacucho, Cuzco, and Puño ; and others again, the departments, Amazonas, Anchas, Guancavelica, and Mosquegna ; cap. Lima, with 40,000 inhabitants.

5. REPUBLIC OF BOLIVIA.

Under Spanish government this country was called Upper Peru ; but becoming free in 1825, it took the name of Bolivar, which was subsequently changed to Bolivia. It covers an extent of 318,000 square statute miles, and has a pop. of 1,700,000 souls, more than half of which are tributary Indian tribes. The cap. is Chuquisaca, formerly termed Charcas or La Plata (pop. 13,000). Other important towns are Potosi, with 14,000,

La Paz de Ayacucho with 32,000, and Cochabamba, with 30,000 inhabitants.

6. REPUBLIC OF CHILI.

This strip of coast land embraces an area of 144,000 square statute miles, with a pop. of about 1,200,000. The state is divided into eight provinces: 1. San Iago, with the cap. Santiago (pop. 60,000), and the important harbor of Valparaiso. 2. Aconcagua, cap. Ciudad de Felipe. 3. Coquimbo, the largest province, cap. Coquimbo, or Ciudad de Serena, pop. 11,000. 4. Colchagua, cap. Villa de Curico. 5. Maule, cap. Villa de Cauquenes. 6. Concepcion, cap. Concepcion. 7. Valdivia, cap. do. 8. Chiloe-Archipelago, consisting of seventy-three islands, of which thirty-six are inhabited by 45 to 50,000 persons. The principal island, Chiloe, has an area of 4200 square statute miles, cap. Ciudad de Castro. Further south lie the Chonos and Guayanecas Islands, and about 460 miles off the coast are the two Juan Fernandez Islands, Masatierra and Masafuero.

7. UNITED STATES OF THE RIO DE LA PLATA.

The Argentine Republic has an area of 726,000 square statute miles, with 675,000 inhabitants, exclusive of some 1,500,000 Indians. The Gauchos, descendants of Spaniards, are remarkable for living almost entirely on horseback, and for the skill with which they use the lasso. Prominent Indian tribes are the Abipones, Guayanas, Tupis, and Charruas, in the north; and the Pampas Indians in the south. The confederacy embraces the following states: 1. *Buenos Ayres*, or *Argentina* in its restricted sense, with 168,000 inhabitants; cap. do., with 85,000 inhabitants. 2. *Entre Rios*, cap. Parana. 3. *Corrientes*, cap. do. 4. *Santa Fe*, cap. do. 5. *Cordova*, cap. do. 6. *St. Iago del Estero*, cap. do. 7. *Tucuman*, cap. San Miguel. 8. *Salta*, cap. do. 9. *Juguy*, cap. San Salvador de Juguy. 10. *Catamarca*. 11. *Rioja*. 12. *San Juan de la Frontera*. 13. *San Luis de la Punta*. 14. *Mendoza*; all with capitals of similar names.

8. REPUBLIC OF PARAGUAY.

This state, so long under the rule of the celebrated dictator, Dr. Francia (deceased in 1840), during which it was entirely inaccessible to foreigners, is the only one in America which does not touch the sea in some point. Its area amounts to 74,000 square statute miles, its pop. to 250,000. The capital is Asuncion, with about 10,000 inhabitants. The individual departments are Asuncion, Concepcion, San Iago, Villarica, Caruguatay, Candelaria, San Fernando, and Santa Hermengilda.

9. (ORIENTAL DEL) URAGUAY.

This state, recognised as independent since 1828, and known under the names of Banda Oriental, Montevideo, and Cisplatina, has an area of 120,000 square statute miles, and a pop. of 140,000, which is mostly European (French, Italian, English), with but few Indians and Negroes. The republic is divided into nine departments: Montevideo, Maldonado, Canelones, San Jose, Colonia del Sacramento, Soriano, Paysandu, Duranjo, Cerro Largo. The capital is Montevideo, with 20,000 inhabitants.

10. PATAGONIA.

By this is to be understood the southern extremity of America, below the parallel of 38° S. lat. It embraces an area of some 105,000 square statute miles, and is inhabited solely by native tribes. Those in the west are termed Moluches; the eastern are the Patagonians, or Tehuelhets, once celebrated for their size, although the narrations of the earlier voyagers in this respect do not appear to be borne out by the experience of the present day. There are no settlements of Europeans.

11. TERRA DEL FUEGO.

The Straits of Magellan separate Patagonia from Terra del Fuego, which consists of eleven large and about twenty small islands, with a total area of about 31,500 square statute miles. On the island l'Hermite is situated the most southern land of America, Cape Horn. The inhabitants are the rude and savage Pescherahs, scarcely 2000 in number. On Staatenland the English have a settlement.

To the east of the Straits of Magellan are situated the Falkland Islands, two large and eighty to ninety small islands, in possession of England, and covering an area of 3360 square statute miles. Of the two large islands, the western is called Falkland, the eastern Soledad. Seat of government, Port William.

V. AUSTRALIA (*Plate 32*).

This continent, sometimes called New Holland, is situated between the parallels of $10^{\circ} 40'$ and 39° S. lat., or entirely within the southern hemisphere. Its area amounts to about 2,240,000 square geographical miles; to 2,560,000 square geographical miles, however, if we include the innumerable small islands which may be referred to it as the centre. The inhabitants, whose numbers are unknown, are chiefly Malays, among which we distinguish two classes: the Malays proper, or Australian Indians, of lightish

color, and the more or less black Papuas or Australian Negroes. The latter live principally on the mainland and the western islands. The number of Europeans probably exceeds 200,000.

1. EAST AUSTRALIA OR NEW SOUTH WALES.

The English have here had a colony of criminals, in the southern part of the east coast, since 1788; it is this district only, divided into nineteen counties, or New South Wales proper, that is known with any degree of precision. In 1837, there were 37,830 convicts, and 47,270 free people: of these 54,600 were Protestants, and 21,900 Roman Catholics. In 1845, the English population amounted to 181,500. The capital is Sidney, with 26 to 30,000 inhabitants in the county of Cumberland. Other important towns are Paramatta and Bathurst.

2. SOUTH AUSTRALIA.

The English have had a settlement here since 1836, the capital of which is Adelaide. In 1842, with an area of 113,040 square geographical miles, it possessed a pop. of 15,000. The European population, at the end of 1849, was estimated at 25,000. East of this is the colony of Australia Felix, established in 1839; cap. Melbourne. West of South Australia lies Nuyts Land, with a colony at Port Raffles, settled in 1827.

3. WESTERN AUSTRALIA.

Since 1828, there has been an English settlement in Leeuwin's Land, on the southern part of this coast, which now embraces twenty-six counties in an area of 75,360 square geographical miles, cap. Perth. The whole colony contained 3476 inhabitants in 1842. The coast north of this is called, in order of succession, Blaming's Land, Edel's Land, Eendracht's Land (the first discovered part of the coast by the Netherlands in 1616), Dewitt's Land, and Tasman's Land.

4. NORTH AUSTRALIA.

In 1824, the English took possession of the peninsula to the west of the Gulf of Carpentaria, called Arnhem's Land and Van Diemen's Land, together with the islands of Melville and Bathurst. On the peninsula of Coburg is situated the town of Victoria. East of the Gulf of Carpentaria is the entirely unknown Carpentaria Land.

5. ISLANDS IN THE VICINITY OF THE MAINLAND.

1. *Van Diemen's Land*, or *Tasmania*, separated from the south-eastern point of Australia by Bass Strait, embraces about 19,200 square geographical miles, and since 1805 has been colonized by the English. It now counts over 50,000 inhabitants, of which 18,700 are convicts; cap. Hobart-town, with 14,500 inhabitants. The island is divided into nine districts. 2. *Fourneaux Islands*, at the eastern entrance of Bass Strait. 3. *King's Island*, at the western entrance of Bass Strait. 4. *Kangaroo Island*, on the coast of South Australia.

6. INNER SERIES OF AUSTRALIAN ISLANDS.

1. *New Guinea*, north of New Holland, and separated from it by Torres Strait, next to New Holland is the largest island of the south seas. It includes an area of about 160,000 square geographical miles, which, however, excepting a few points along the coast, is entirely unknown. The inhabitants are partly Malays, under the names of Haraforas, Alfoaras, and Alfakis, partly Papuas and partly Badschus (wandering fishermen). 2. *Admiralty Islands*, north-east of New Guinea, about thirty in number, with the Hermit Islands. 3. *Archipelago of New Britain*, consisting of New Britain (the largest), New Ireland (Tombara), and New Hanover, the total area of which amounts to 18,000 square geographical miles. The inhabitants are Papuas. 4. *Archipelago of the Louisiade*, south of New Britain. 5. *Solomon's Islands*, or New Georgian Islands, south-east of New Ireland. Near them lie the Arsacides. 6. *Islands of Queen Charlotte*, or Archipelago of Santa Cruz, east of the preceding. The largest island is Santa Cruz or Egmont. To the south-east lies the island of Wanikoro or La Perouse (also called Recherche). 7. The *New Hebrides*, nine large and many small islands, south of the preceding. The largest island is Espiritu Santo; next to it comes Mallicollo. Banks and Torres Islands belong here. 8. *New Caledonia*, south-east of the preceding, 4800 square geographical miles, to the east of which lie the Loyalty, Cypress, Plant, Walpole, and Matthew's Islands.

7. OUTER SERIES OF AUSTRALIAN ISLANDS.

1. *Mariannes* or *Ladrones*, 14-20 islands, of about 912 square geographical miles, in possession of Spain. Only two or three of them are inhabited. On the Guam, the largest and most southern, is situated the capital, San Ignacio d'Agana; the population amounts to about 5000. 2. The *Carolines*, or New Philippines, separated from the Mariannes by the Caroline Straits, a group of several hundred diminutive islands, claimed but not settled by Spain. 3. The *Pelews*, west of the Carolines, more than

twenty inconsiderable islands. The largest are termed Babeltuab and Corure. 4. *Lord Mulgrave's Archipelago*, consisting of two groups: the Radack and Ralick Islands in the north, sometimes called the Marshall Islands, and the Gilbert's Islands, in the south. The number of the latter amounts to seventy. In the vicinity lie the Brown's group, as also the Fisher, Kutusow, and Suwarow Islands. 5. The *Fejee Islands*, to the south of Gilbert's Islands and east of the New Hebrides, 200 and more in number. Nearly all are small, but well settled; the largest is Pau. 6. The *Tonga* or Friendly Islands, south-east of the preceding; 32 large and over 100 small islands, of which Wauwau, Lifuga, and Tonga-Tabu, are the largest. The inhabitants are of a light brown color, friendly disposition, and somewhat civilized; they number over 200,000, with a king at their head. 7. The *Samoa*, or Sailor's group, north-east of the preceding, eight small but densely populated islands, of which Pola or Otawhi, Ogalava, and Mauna, are the largest. 8. *Cook's Islands*, south-west of the last group. 9. The *Archipelago* of the *Low Islands* consists mainly of coral rocks, but little known. They are probably the most recent of the Australian islands. The southern group has received the name of the Dangerous Islands. Here belong the Palliser Islands, and Pitcairn's Island lying out of the torrid zone. 10. The *Society Islands*, fourteen large and numerous smaller islands, discovered since 1606, and most visited and best known of all the south sea islands. The population, governed by a king, amounts to 100,000 persons, some of which are of dark brown, some of light olive, nearly white complexion; they are of good disposition, and have been brought within the pale of civilization by English and American missionaries. The islands are divisible into two groups; *a*, the south-eastern, called George's Islands, including Otaheite or Tahiti, the largest of all, 420-525 square statute miles, and very fertile, now under the so-called protection of the French; Eimeo, 52 square statute miles, and 1500 inhabitants; Tabuai, Manu, Maitia, and the five Tetuaro Islands. *b*. The north-western group, with Rajatea, 52 square statute miles, pop. 1800; Taha, 31 square statute miles; Huaheine, 26 square statute miles, with 1800 inhabitants; Borabora, 14 square statute miles, pop. 1000; Maurua, 10 square statute miles. 11. *Mendaña's Archipelago*, consisting of two groups: *a*, a southern, the Marquesas Islands, five islands of 2352 square statute miles (the largest is Hiwaoa, or St. Dominica, the most visited Tahuata or St. Christina, owned by France since 1841); *b*, the eight Washington or New Marquesas. The largest of these is Nukahiwa, with 18,000 inhabitants, occupied by the French since 1843.

8. SCATTERED ISLANDS.

1. *New Zealand*, to the south-east of New Holland, consists of two islands, separated by Cook's Strait: Ikanamauwi or North, and Tawai-Punamu or South Island. The two together embrace an area of about 64,000 square geographical miles, with a pop. of 130,000. These are of light brown color, and of very savage disposition. The English have taken

possession of the island since 1840 ; since when, numerous colonies have started up on the northern island, including over 10,000 Europeans. There are two towns, Nelson and Wellington, of which the latter is the capital. Here belongs Stewart Island, to the south of the southern island. In the vicinity lie : in the north, Norfolk Island (with an English convict colony), and the three Kermadec Islands ; to the south-east, Chatham Island, Bounty Island, and Antipodes Island ; in the south, the Auckland and the Macquarie Islands. The latter are the most southern of all the Australian islands.

2. The *Sandwich Islands* in the Pacific Ocean, thirteen in number, with an area of 5270-6330 square statute miles, and a population of 120-150,000 (among them 90,000 Christians). These belong to the Malay race, are of a dark color, fine figure, and far advanced in civilization, through the agency of missionaries. In 1830, there were 30,000 of the inhabitants who could read. The islands form a monarchy under a king (now Tameamea III.) ; the Christian is the state religion. The largest island is Hawaii, or Owyhee, with an area of about 4220 square statute miles, and 85,000 inhabitants. On the island of Oahu, 527 square statute miles, and with a pop. of 28,000, is the royal residence, Honolulu, with 10,000 inhabitants. The largest of the remaining islands are Maui, area 633 square statute miles, pop. 25,000 ; Tawai, area 527 square statute miles ; Morotai, area 168 square statute miles ; and Ranai, area 105 square statute miles.

4. *Eastern Island*, or Waihu, and the uninhabited island Sala y Gomez. are the most eastern of all the Australian islands.

PLANOGRAPHY.

Plans of the Principal Cities of Europe (Plates 33—44).

1. LONDON (*Plate 33*).

LONDON, the largest city in Europe, and the capital of the British Empire, is situated on both banks of the Thames, about sixty miles from where it empties into the North Sea. The population amounts to over two millions (the London Police District, in 1849, included even 2,336,960), among which are only about 8000 soldiers. It consists of three portions: the city in the north and east, Westminster in the west, both on the north bank of the Thames, and Southwark on the south bank; the last belongs to the County of Surrey. The *City*, or *Old Town*, of an area equal to one square mile, is divided into twenty-six districts. It is contracted and irregularly built, but constitutes the heart of the city or the principal seat of commerce. The principal streets are Cheapside and Fleet street. The most conspicuous buildings are St. Paul's Cathedral, the largest Protestant Church in the world, 500 feet long, 250 feet broad, and 356 feet high, with a dome 282 feet high, 140 broad, and resting upon thirty-two columns; it contains fifty monuments, among them one of Nelson, who is here buried. There are, likewise, the Tower, on the Thames, an old citadel, and formerly the royal residence, containing many dwelling houses, the Magazine, the Mint, the Public Archives, prisons of state; the Bank; the new Exchange, 293 feet long, 175 broad, with a portico, a tower 160 feet high, and a place of assembly 270 feet long and 112 wide; Guildhall, with a hall 153 feet long, 48 broad, and 55 high, capable of accommodating several thousand persons; the Custom House, 480 feet long, with a beautiful façade, and a hall 190 feet long and 66 broad; the East India House; Newgate Prison (capable of containing 900 persons). In the city is also the Monument, a column of marble 200 feet high, in commemoration of the great fire of 1666.

Westminster, the finest and most regularly built part of London, is divided into sixteen districts. The principal streets are the Strand; Piccadilly, with the Burlington Arcade, 600 feet long, and lighted from above with glass windows; Regent street, Oxford street, and New Bond street. The principal squares are Covent Garden, Hanover, Charing Cross, with the equestrian statue of Charles I., Lincoln's Inn Fields, St. James's square, with the statues of the Duke of York and William III.; Russell square, Grosvenor square, with the statue of George II. on horseback, &c. The principal buildings are St. James's Palace, a royal residence since 1695, and Buckingham House, the residence of the queen, in St. James's Park; Westminster Abbey, where the sovereigns of England are crowned and buried, a master-piece of Gothic architecture, 390 feet

long, with forty-eight marble columns and many chapels; the immense new Houses of Parliament, built in the Gothic style on a terrace along the Thames, with the statue of Canning in front; Westminster Hall; the Admiralty Building; St. Martin's, St. Pancras', St. Stephen's, St. Ann's, St. George's, and St. Margaret's Churches; the British Museum, with a large library (3-400,000 vols., and 50,000 manuscripts), and one of the finest collections of Natural History and of Art in the world; the National Gallery in Trafalgar square, 461 feet long, and 56 feet broad; the University Building, 430 feet long, with chapel, library, and dining hall; the Pantechicon, 500 feet long, with numerous shops; the three principal theatres, Queen's Theatre or the Italian Opera House, for 2400 persons, Covent Garden, and Drury Lane, the latter capable of containing 3,000 spectators; the Barracks of the Guards. The finest private house is the palace of the Duke of Northumberland; next to it comes Apsley House, the palace of the Duke of Wellington, with those of Lords Marlborough, Bedford, Stafford, Spencer, &c.

Southwark, the southern part of London, inhabited by the poorest and humblest part of the population, has but few buildings of any note, besides Lambeth House (residence of the Archbishop of Canterbury), and the Queen's Bench (Court of Justice), with numerous prisons. Other portions of London, arising from the incorporation of individual villages, lie to the west, north, and east, about the city and Westminster. They may be divided into three divisions or parishes: *Holborn*, including Marylebone, Paddington, and Pancras, and called West End, from lying west of the city; *Finsbury*, north of the city, with Clerkenwell, Finchley, Islington, &c.; *Tower Hamlets*, east of the city, and therefore called East End, with Bethnal Green, Hackney, Limehouse, Shoreditch, Stratford, Stepney, Spitalfields, Wapping. On the south bank of the Thames lie also Lambeth, Battersea, Camberwell, Clapham, Wandsworth, Rotherhithe, &c., which together constitute the *Brixton* division.

Six bridges cross the Thames for the purpose of accommodating the northern and southern parts of the city. These are, from west to east: 1, the iron Vauxhall Bridge, 861 feet long, with nine arches; 2, Westminster Bridge, 1223 feet long, 48 feet broad, with 14 piers; 3, the superb Waterloo Bridge of dressed granite, 1248 feet long, with 9 large arches; 4, Blackfriars' Bridge, 995 feet long, with 9 arches; 5, the iron Southwark Bridge, with three arches, the middle one of which has a span of 240 feet; 6, London Bridge, 928 feet long, 52 feet broad, with five arches. To the east, there is the Tunnel, constructed by Brunel in 1824-42, between Rotherhithe and Wapping, 1300 feet long, 34 feet beneath the bed of the river, divided into vaulted galleries, $13\frac{3}{4}$ feet broad, and $16\frac{1}{2}$ feet high each.

The most frequented promenades are: 1, St. James's Park, with a beautiful gate of marble, and the equestrian statue of George IV.; 2, Green Park; 3, Hyde Park, reaching to Kensington, 395 acres in extent, with a statue of Achilles eighteen feet high, and one of Wellington on a pedestal 150 feet high; 4, Regent's Park, 360 acres, newly laid out, in the

West End (here are situated the Botanic Garden and Zoological Gardens).

The immense docks, or artificial basins for the reception of vessels, deserve especial mention. Of these, there are the West India Docks, covering 24 acres, the London Docks, of 20 and 14 acres, the East India Docks, and St. Catharine's Docks, of $11\frac{1}{2}$ acres, &c. They are all surrounded by gigantic warehouses.

EXPLANATION OF THE PLAN.

Bridges.

- a. Battersea or Chelsea bridge.
- b. Vauxhall bridge.
- c. Westminster bridge.
- d. Hungerford bridge (suspension).
- e. Waterloo bridge.
- f. Blackfriars' bridge.
- g. Southwark bridge.
- h. London bridge.

Docks and Basins.

- I. South dock.
- II. Timber docks.
- III. Commercial docks.
- IV. Grand Surrey outer dock.
- V. Grand Surrey inner dock.
- VI. Greenland dock.
- VII. East county dock.
- VIII. and IX. West docks.
- X. Mast pond.
- XI. East and west docks.
- XII. Mill pond.
- XIII. London docks.
- XIV. East London dock.
- XV. St. Catharine's dock.

Squares.

- A. Grosvenor square, with the statue of King George II.
- B. Portland square.
- C. Berkeley square, with the statue of King William III.

- D. St. James's square.
- E. Hanover square.
- F. Manchester square.
- G. Cavendish square.
- H. Golden square.
- I. Soho square, with the statue of King Charles I.
- K. Bedford square.
- L. Bloomsbury square, with the statue of the minister Fox.
- M. Russell square.
- N. Tavistock square.
- O. Gordon square.
- P. Easton square.
- Q. Brunswick square.
- R. Mecklenburg square.
- S. Red Lion square.
- T. Lincoln's Inn square.
- U. Trinity square.
- V. Welclose square.
- W. Finsbury square.
- X. Smithfield square.
- Y. The Oval.

Public Buildings.

- 1. St. Paul's Church.
- 2. The Tower.
- 3. New Mint.
- 4. Bank.
- 5. The Lord Mayor's House.
- 6. House of the East India Company.
- 7. Exchange.
- 8. Custom House.
- 9. Guildhall.

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| 10. London Institute. | 57. St. Leonard's Church. |
| 11. St. Luke's Hospital. | 58. Alms House. |
| 12. Charter House Hospital. | 59. St. Luke's Workhouse. |
| 13. St. Bartholomew's Hospital. | 60. Sadler's Wells Theatre. |
| 14. Fleet Prison. | 61. Polygon. |
| 15. Entrance to Temple Garden. | 62. Park square. |
| 16. Westminster Abbey. | 63. Statue of the Duke of Kent. |
| 17. Parliament Houses. | 64. Marylebone Church. |
| 18. St. James's Palace. | 65. Wellington's Monument. |
| 19. Royal Palace. | 66. St. George's Hospital. |
| 20. Somerset House. | 67. Lock Hospital. |
| 21. Admiralty. | 68. Invalids' Hospital. |
| 22. War Department. | 69. New Bridewell. |
| 23. Treasury. | 70. Lambeth Palace. |
| 24. British Museum. | 71. Elephant and Castle. |
| 25. University of London. | 72. St. John's Church. |
| 26. Colosseum. | 73. Church of Mary Magdalene. |
| 27. Diorama. | 74. Jenkins's Nursery. |
| 28. House of Correction. | |
| 29. Chelsea Hospital. | |
| 30. Guy's Hospital. | |
| 31. St. Thomas's Hospital. | |
| 32. Magdalene Hospital. | |
| 33. Bethlehem Hospital (Bedlam). | |
| 34. Queen's Bench Prison. | |
| 35. Vauxhall. | |
| 36. Temple Gardens. | |
| 37. Gray's Inn Gardens. | |
| 38. Zoological Gardens. | |
| 39. Ranelagh. | |
| 40. Deaf and Dumb Institute. | |
| 41. Blind Institute. | |
| 42. Surrey Theatre. | |
| 43. Astley's Theatre. | |
| 44. Italian Opera House. | |
| 45. Covent Garden Theatre. | |
| 46. Drury Lane Theatre. | |
| 47. Lyceum or English Theatre. | |
| 48. Adelphi Theatre. | |
| 49. West Theatre. | |
| 50. Pantheon. | |
| 51. London Monument. | |
| 52. St. George's Church. | |
| 53. St. Paul's Cathedral. | |
| 54. London Hospital. | |
| 55. St. Stephen's Chapel. | |
| 56. Jew's Hospital. | |

Streets.

1. Waterloo.
2. Grand Surrey.
3. Westminster.
4. Borough.
5. Lambeth.
6. New Camberwell.
7. Kennington.
8. Walworth.
9. New Kent.
10. Old Kent.
11. St. George's.
12. Long Lane.
13. Tooley.
14. West India Dock.
15. Radcliffe Highway.
16. New street.
17. Handel's.
18. White Chapel.
19. Mile End.
20. Hackney.
21. Bethnal Green.
22. Shoreditch, Kingsland.
23. Bishopsgate.
24. Thames.
25. Cheapside.

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| 26. Newgate. | 47. Piccadilly. |
| 27. Holborn. | 48. St. George |
| 28. Oxford. | 49. Whitehall. |
| 29. Pity. | 50. Vauxhall. |
| 30. Goswell. | 51. Belgrave square. |
| 31. Aldersgate. | 52. King. |
| 32. New. | 53. Sloane. |
| 33. Gray's Inn Lane. | 54. Brompton. |
| 34. Seymour. | 55. Marlborough. |
| 35. Hampstead. | 56. Clarence. |
| 36. Tottenham Court. | 57. Grove. |
| 37. Portland Place. | 58. Edgeware. |
| 38. Regent. | 59. Great Union. |
| 39. Wimpole. | |
| 40. Bond. | |
| 41. Baker. | |
| 42. Gloucester. | |
| 43. Park. | |
| 44. Rawford. | |
| 45. Devonshire. | |
| 46. Audley. | |

Principal Divisions of the City.

- A. City proper.
- B. Westminster.
- C. Southwark.

2. PARIS (*Plates 34, 35*).

Paris, the time-honored capital of France, lies in a plain traversed by the Seine. At the last census, of 1846, it had a population of about 1,053,897 inhabitants, amongst which 945,721 belonged to the fixed population, and 88,475 to the floating, or those in schools, hospitals, &c.; and 19,701 to the garrison. Paris is about fourteen miles in circumference, with an area of three millions and a half of hectares, and is divided into twelve Mairies or Arrondissements, with forty-eight Quartiers or Police districts. The Seine separates it into a south and north part, the latter of which is the larger. It is inclosed by a continuous wall, twelve to sixteen feet high, through which lead fifty-eight entrances or Barrières. The city contains 30,000 houses, 113 churches and chapels, 43 public libraries, 40 convents, 22 theatres, 27 hospitals, 33 barracks, 22 bridges, 80 fountains, more than 80 public squares, and some 1700 streets and quais. The principal points of interest are as follows:

a. In the City Proper, north of the Seine: the Tuileries, formerly the residence of the French king, 1071 feet long, with a garden 2000 feet in length; the Louvre, 525 feet long, united with it by a superb building with a colonnade 1332 feet in length, and containing the antique museum, the galleries of paintings (in a hall 1332 feet long), of antiquities, of models of ships, of plaster casts, of designs, and of recent statuary; the Palace Elysée Bourbon, formerly the palace of the Duke of Bourdeaux, now the residence of the President of the Republic; the Palais Royal, formerly the property of the Duke of Orleans, with a court 700 feet long and 300 broad, surrounded

by arcades of 180 arches, containing the most brilliant shops, &c.; the Palace of the Bourse, and of the Chamber of Commerce, 208 feet long, adorned with sixty-six Corinthian columns; the Library Building, containing, according to different estimates, from 700,000 to 1,000,000 volumes, and over 80,000 manuscripts, 150,000 coins, and one million and a half of engravings and charts; the great church of St. Eustache, with painted glass windows; the beautiful Magdalene Church, 318 feet long, 138 feet broad; the Hospital of St. Louis, with 800 beds; the City Hall or Hotel de Ville. The largest and most beautiful square is the Place de la Concorde (formerly Place Louis XV., and Place de la Revolution), 780 feet long, and adorned with the Obelisk of Luxor, a mass of granite 45 feet high; other beautiful squares are the Place du Carrousel, before the Tuileries, with a magnificent triumphal arch 45 feet high; the Champs Elysées, which leads to the triumphal Arch de l'Etoile, 152 feet long, 138 broad, and 80 feet high; the Place Vendome, 450 feet long, with the Victor's column of bronze, 140 feet high, and 12 thick, having the statue of Napoleon on the top, access to which is gained by 176 steps; the Place Royale, with the equestrian statue of Louis XIII.; the Place de la Bastille, with the July column of bronze, 158 feet high, and 10 feet thick; the Place Louvois, the Place du Chatelet, and the Marché des Innocens, all with beautiful fountains; the Place des Victoires, with the statue of Louis XIV., &c.

b. *The Ancient City*, or Cité, consists of three islands of the Seine. On the largest of these, Cité in a restricted sense, or Ile du Palais, is situated the grand church of Notre Dame, a masterpiece of Gothic architecture, 390 feet long, 144 feet broad, with a dome 162 feet high, and two towers of 204 feet. Here are also the Palace of the Archbishop; the Palais de Justice; the prison Conciergerie; and the Hospital Hotel Dieu, which contains 1500 beds in twenty-three rooms. The two other islands are termed St. Louis and Louviers.

c. In the inconsiderable portion of the city on the south bank of the Seine (*Université*), are the Museum of Natural History and the Botanic Garden (Jardin des Plantes), with the richest menagerie in the world; the Castle of Luxemburg, with a large and beautiful garden; the Pantheon, or the former church of St. Genoveva, 340 feet long, with a superb dome, supported by 130 columns; the Hospital Salpêtrière, for 5000 old women, and the Insane Asylum Bicêtre, for 3000 insane persons; the Manufactory of the Gobelins; the Palace of the Chamber of Deputies, with a beautiful hall with columns and extensive gardens, which end in a terrace 1500 feet long; the Observatory, with a platform 85 feet high; the Hotel des Monnaies or the Mint Building, 360 feet long; the Military School, now Barracks, consisting of six buildings with fifteen courts, 1320 feet long, and 780 feet broad; the Hospital of the Invalides, with a beautiful church, in which is situated the tomb of Napoleon. The Champ de Mars is an extensive square at the west end of the city, 2700 feet long and 900 feet broad, serving for military parades.

The most important of the bridges over the Seine are the bridge of Jena, a stone bridge 460 feet long, the bridge or Pont de la Concorde, 600 feet

long, of five arches, and adorned with twelve statues; the Pont Royal; the Pont des Arts, 516 feet long, of nine iron arches; the Pont Neuf, 712 feet long, with the statue of Henry IV., fourteen feet high; the Bridge of Austerlitz, with five iron arches, 400 feet long.

The Catacombs were formerly quarries, from which was obtained the stone used in building the city of Paris. They now constitute an enormous subterranean cemetery, access to which is obtained by a flight of ninety steps. Other points of interest are the Artesian Well in the Slaughter House of Grenelle, 1961 (English) feet deep; the Cemetery of Père la Chaise, in the eastern part of the city, with 25,000 graves, and innumerable monuments. The following communes are united with the city government: On the right of the Seine, Belleville, Batignolles, Montmartre, La Chapelle, La Villette, Neuilly, Bercy, Passy, Charronne; on the left bank, Baugirard, Chantilly, Mont Rouge, and Grenelle. These lie between the barrières and the fortifications erected since 1841. The fortifications consist of eighty-five bastions, with walls, ditches, &c. At from 800–2500 paces from the circular wall are sixteen detached forts, mounted with 2208 cannon. Instead of the ancient fortifications, the interior of the city, within the circular wall, is surrounded by ten Boulevards, 36,000 feet long, and planted with trees.

Railroads lead from Paris, on the north bank of the Seine, northward to Versailles (St. Germain and Rouen) and Brussels (Northern Railroad), and eastward to Strasburg; on the left bank of the Seine, south-west to Versailles, south-east to Orleans and Lyons.

EXPLANATION OF THE PLANS.

Paris and its Vicinity.

Suburbs.

Public Squares.

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| A. Justice du Gros-Cailion. | A. Place de la Concorde. |
| B. Faubourg St. Germain. | AA. “ et barrière de l’Etoile. |
| C. “ St. Jacques. | B. “ Vendôme. |
| D. “ St. Marceau. | C. “ du Carrousel. |
| E. “ St. Antoine. | D. “ de la Bourse. |
| F. a. “ du Temple. | E. “ des Victoires. |
| F. b. “ St. Martin. | F. “ du Palais-Royal. |
| H. G. “ Ménilmontant. | G. “ du Musée. |
| H. “ St. Denis. | H. “ du Louvre. |
| I. “ Poissonnière. | I. “ de l’Oratoire. |
| K. “ Montmartre. | K. “ de la Madeleine. |
| L. “ au Roule. | L. “ du Châtelet. |
| M. “ St. Honoré. | M. “ de l’Hôtel de Ville. |
| N. Justice de la Chaussée d’Antin. | N. “ de la Bastille. |
| O. “ de la Cité. | O. “ Royale. |
| P. “ de l’Ile St. Louis. | P. “ du Trône. |

- Q. Place du Panthéon.
 R. " de l'Odéon.
 S. " St. Sulpice.
 T. " de Vauban.
 U. " de Fontenoy.
 V. " du Parvis-Notre-Dame.
 W. " Dauphine.

Quays and Streets.

1. Quai de la Grève.
2. " de la Megisserie.
3. " de l'Ecole.
4. " du Louvre.
5. " des Tuileries.
- 5¹. " Cours la Reine, and Quai
de la Conférence.
6. " d'Orsay.
- 6¹. " Voltaire.
7. " Malaquais.
8. " Conti.
9. " des Grands Augustins.
10. " St. Michel.
11. " Montebello ou Billy.
12. " de la Tournelle.
13. " St. Bernard.
14. " d'Austerlitz.
15. " de la Rapée.
16. " Moraud.
17. " des Ormes.
18. " de Béthune.
19. " de l'Archevêché.
20. " des Orfèvres.
21. " de l'Horloge.
22. " Napoléon.
23. " Bourbon.
24. " d'Anjou.
25. Port aux Vins.
26. Rue Royale.
27. " Trouchet.
28. " Malherbes.
29. " Rivoli.
30. " Castiglione.
- 30¹. " de la Paix.
31. " St. Honoré.
32. " Richelieu.

33. Rue Vivienne.
34. " Montmartre.
35. " Poissonnière.
36. " St. Denis.
37. " St. Martin.
38. " Rambuteau.
39. " du Temple.
- 39¹. " vieille du Temple.
40. " St. Louis.
41. " St. Antoine.
- 41¹. " du faub. St. Antoine.
42. " Lafayette.
43. " du faub. du Temple.
44. " du faub. St. Martin.
45. " du faub. St. Denis.
46. " du faub. Poissonnière.
47. " du faub. Montmartre.
48. " Laffitte.
49. " du Mont Blanc.
50. " du faubourg du Roule.
51. " du faubourg St. Honoré.
52. " d'Arcole.
53. " de la Seine.
54. " de l'Université.
55. " de Vaugirard.
56. " de Sèvres.
57. " St. Jacques.
58. " St. Victor.

Boulevards.

- a. Boulevard de la Madeleine.
- b. " des Capucines.
- c. " des Italiens.
- d. " Montmartre.
- e. " Poissonnière.
- f. " Bonne-Nouvelle.
- g. " St. Denis.
- h. " St. Martin.
- i. " du Temple.
- k. " des Filles du Calvaire.
- l. " St. Antoine.
- m. " de l'Arsenal ou de Bourdon.
- n. " de l'Hôpital.
- o. " des Gobelines.
- p. " St. Jacques.

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| <i>q.</i> Boulevard d'Enfer. | 11. Palais de l'Institut. |
| <i>r.</i> " du Mont Parnasse. | 12. Observatoire. |
| <i>s.</i> " des Invalides. | 13. Palais de Justice. |
| <i>t.</i> Avenue de Breteuil. | 14. " Soubise, Archives du Roy- |
| <i>u.</i> Allée des Veuves. | aume. |

Bridges.

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| <i>a.</i> Pont de Bercy, ou de la Gare. | 15. Le Temple. |
| <i>b.</i> " d'Austerlitz. | 16. Banque de France. |
| <i>c.</i> " de Constantine. | 17. Ministère des Affaires étrangères. |
| <i>d.</i> " de Damiette. | 18. Ministère des Finances. |
| <i>e.</i> " de la Tournelle. | 19. Elysée-Bourbon. |
| <i>f.</i> " Marie. | 20. Ministère de la Marine. |
| <i>g.</i> " de la Cité. | Q. Panthéon. |
| <i>h.</i> " Louis Philippe. | M. Hotel-de-Ville. |
| <i>i.</i> " d'Arcole. | D. Bourse et Tribunal du commerce |
| <i>k.</i> " Notre Dame. | 21. Garde-Meubles. |
| <i>l.</i> " au Change. | |
| <i>m.</i> " Neuf. | |
| <i>n.</i> " de l'Archevêché. | |
| <i>o.</i> " au Double. | |
| <i>p.</i> " Petit St. Michel. | |
| <i>q.</i> " St. Michel. | |
| <i>r.</i> " des Arts. | |
| <i>s.</i> " du Carrousel. | |
| <i>t.</i> " Royal. | |
| <i>u.</i> " de la Concorde. | |
| <i>v.</i> " des Invalides. | |
| <i>w.</i> " d'Jena. | |
| <i>x.</i> " de Grenelle. | |

Churches.

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| <i>l.</i> " au Change. | 22. Eglise Notre Dame. |
| <i>m.</i> " Neuf. | 23. " St. Germain-des-Prés. |
| <i>n.</i> " de l'Archevêché. | 24. " St. Thomas d'Aquin. |
| <i>o.</i> " au Double. | 24'. " St. Valère. |
| <i>p.</i> " Petit St. Michel. | 25. " St. Etienne-du-Mont. |
| <i>q.</i> " St. Michel. | 26. " du Val-de-grâce. |
| <i>r.</i> " des Arts. | 27. " St. Germain l'Auxerrois. |
| <i>s.</i> " du Carrousel. | 28. " St. Eustache. |
| <i>t.</i> " Royal. | 29. " St. Roch. |
| <i>u.</i> " de la Concorde. | 30. " St. Gervais. |
| <i>v.</i> " des Invalides. | 31. " St. Paul. |
| <i>w.</i> " d'Jena. | 32. " Notre Dame de Lorette. |
| <i>x.</i> " de Grenelle. | 33. " St. François de Paul. |
| | S. " St. Sulpice. |
| | K. " de la Madeleine. |
| | 34. Chapelle St. Louis. |

Public Buildings.

1. Palais des Tuileries.
2. " du Louvre.
3. " Royal.
4. " du Luxembourg (Chamber of Peers).
5. " Bourbon (Chamber of Deputies).
6. Hôtel des Invalides.
7. Ecole Militaire.
8. Palais de la Legion d'Honneur.
9. " du quai d'Orsay.
10. Hôtel des Monnaies.

Theatres.

35. Académie Royale de Musique.
36. Théâtre Italien.
37. " François.
38. " Ventadour.
39. " de l'Opera-comique.
40. " de la Porte St. Martin.
41. " de l'Ambigu-comique.
42. " du Cirque Olympique.

43. Théâtre du Gymnase dramatique. 76. Prison du Nouveau Bicêtre.
 44. " des Varietés. 77. " Militaire de Montaigne.
 45. " Cirque des Champs
 Elysées.

Scientific Institutions.

45. b. Panorama.

R. Théâtre de l'Odéon.

78. Sorbonne.

79. Ecole de Droit.

80. " de Medecin.

81. " Polytechnique.

82. " des Beaux-Arts.

83. " des Mines.

84. " de Musique.

85. Collège de France.

86. Institution des Sourds-muets.

87. Conservatoire des Arts et Metiers.

88. Bibliothèque Royale.

89. Museum d'histoire naturelle.

90. Séminaire de St. Sulpice.

Halls and Markets.

46. Entrepôt général.

47. Halle aux vins.

48. " aux blés.

49. Marché du Temple.

50. " des Innocents.

51. " St. Germain.

52. " augibier (game market).

53. " St. Honoré.

53. b. " aux chevaux.

54. Abattoirs (slaughter-houses).

55. Grenier de réserve.

*Military Plan of Paris (pl. 35).**Hospitals.*

56. Hôtel Dieu.

57. Hôpital de la Pitié.

58. " de la Charité.

59. " St. Antoine.

60. " de la Salpêtrière.

61. " Cochin.

62. " Necker.

63. " Beaujon.

64. " St. Louis.

65. Hospice des Enfants trouvés.

66. " des Orphelins.

67. " des Quinze-vingts.

68. " des femmes incurables.

69. " des hommes incurables.

1. Palace of the Tuileries.

2. Chamber of Peers.

3. Chamber of Deputies.

4. The Louvre.

5. Hotel de Ville.

6. War Department.

7. Principal quarter of the first mili-
tary division.

8. Military Intendency.

9. Military School.

10. Hôtel des Invalides.

11. Arsenals and Military Storehouses.

I. 12. Principal quarter of the first
Legion of the Nat. Guards.

II. 13. " 2d Legion.

III. 14. " 3d "

IV. 15. " 4th "

V. 16. " 5th "

VI. 17. " 6th "

VII. 18. " 7th "

VIII. 19. " 8th "

IX. 20. " 9th "

X. 21. " 10th "

XI. 22. " 11th "

XII. 23. " 12th "

Prisons.

70. Prison de la Force.

71. " Ste. Pélagie.

72. " des Madelonnettes.

73. " St. Lazare.

74. " Clichy (des dettes).

75. " Modèle.

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|--|------------------------|
| 24. Large space intended for Parades and Barracks. | v. Pont des Invalides. |
| 25. Strategetical ways, connecting the forts. | w. " d'Jéna. |
| | x. " de Grenelle. |
| 26. Barracks. | |
| 27. Military Hospital. | |
| a. Pont (bridge) de Bercy. | |
| b. " d'Austerlitz. | |
| c. " de Constantine. | |
| d. " de Damiette. | |
| e. " de la Tournelle. | |
| f. " Marie. | |
| g. " de la Cité. | |
| h. " Louis Philippe. | |
| i. " d'Arcole. | |
| k. " Notre Dame. | |
| l. " au Change. | |
| m. " Neuf. | |
| n. " de l'Archevêché. | |
| o. " au Double. | |
| p. " St. Michel (Petit). | |
| q. " St. Michel (Grand). | |
| r. " des Arts. | |
| s. " du Carrousel. | |
| t. " Royal. | |
| u. " de la Concorde. | |

Observations.

1. The line outside of the ring wall and of the forts, indicates the breadth of the glacis.
2. The first dotted line indicates the breadth of the military district.
3. The second dotted line about the forts, indicates the mean musket range.
4. The second dotted circular line about the forts, indicates the mean grapeshot range.
5. The third dotted circular line indicates the extreme range of the mortars and twenty-four pounders.
6. The Bastions of the Ring walls bear the successive numbers, 1-94, beginning at the Seine above Bercy.

3. CONSTANTINOPLE (*Plate 36*).

Constantinople, the Turkish Stamboul, the capital of the Turkish Empire, is situated at the southern entrance of the Straits of Constantinople, formerly the Bosphorus. It forms a triangle, the northern part of which is bounded by the Bay of Constantinople, the southern by the Sea of Marmora, while the third side is occupied by fields and gardens. The population, like that of all eastern cities, is hard to determine, although it amounts at least to half a million, of which half are Turks, one fourth Greeks, and the rest Europeans, Jews, and Armenians. The city wall, erected by the Emperor Theodosius, is provided with 548 towers, and protected by a ditch twenty-five feet broad; the walls are doubled on the land side, often trebled, with a space of twenty feet between the walls. The most remarkable part of the city is its extreme point on the sea, which contains the castle of the Grand Turk, called Serai or Seraglio; this is over two miles in circumference, includes a number of gardens, mosques, &c., and is inhabited by some thousands of persons. Near the Seraglio is the residence of the Grand Vizier, the gate of which is called the Sublime Porte. Next to the Seraglio, the most remarkable public buildings are the Mosques, built by the Sultans.

Of these there are 517 in all, thirty-six of them large ; conspicuous among them is the Hagia Sofia, or the former church of St. Sophia, built by the Emperor Justinian in 538. It is 270 feet long, with a magnificent dome, and 170 columns of marble, granite, &c. Also the Mosque Suleimanje, built in 1550, and a masterpiece of oriental architecture, with thirteen domes ; the Mosque Ahmedidje, with six domes (all other mosques having but four). In addition to these, Constantinople has 24 Greek, 9 Roman Catholic, and three Armenian Churches, 183 Hospitals, 101 Cafés, 9 Insane Asylums, 130 Public Baths, 40 Khans or houses of refreshment, &c. The most important bazaar is the labyrinthine Jeni Bazaar, in the middle of the city. The only noteworthy public square is the Atmeidan, 250 paces long, inclosed by pillars, and with an obelisk sixty feet high ; this was formerly a circus for races. Of the seven aqueducts, two date back as far as the Grecian times ; as also the two colossal cisterns, of which one, entirely in disuse, contains 672 marble pillars, and the other 336. Of the sixteen suburbs, the most important are Pera, the residence of the foreign embassies, and of many European merchants ; and Galata, both separated from the town itself by the bay ; Tophana ; Hassan or Kassim Pasha ; Fanar or Fanal, at the point of the bay, where dwell most of the Greeks, hence called Fanariotes. Scutari, on the Asiatic side, separated from Constantinople by the Bosphorus, is also to be looked upon as a suburb.

EXPLANATION OF THE PLAN.

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| A. Seraglio of the Sultan. | 17. Old Seraglio. |
| B. Former quarter of the Janissaries. | 18. Mosque Suleimanje. |
| C. Quarter of the Armenians. | 19. Coffee Houses. |
| D. The Blachernes. | 20. Hospital. |
| E. Quarter of the Franks. | 21. Mosque Khalilzade. |
| 1. Mosque of Aja Sofia. | 22. Former barracks of the Janissaries. |
| 2. Church of St. Irene. | 23. Laleli-dschamisi. |
| 3. The Atmeidan, with the Mosque of Achmed. | 24. Mosque of Sultana Valide. |
| 4. First Court of the Seraglio. | 25. Custom House. |
| 5. Second Court of the Seraglio. | 26. New Imaret. |
| 6. Imperial Treasury. | 27. Budrun-dschamisi. |
| 7. Summer Harem | 28. Mosque Achmed Hissar. |
| 8. Winter Harem | 29. " Daud Pasha. |
| 9. Marble Kiosk | 30. " Hekim Oghli. |
| 10. Vizier's Seraglio. | 31. " Mustafa. |
| 11. Mosque of Sultan Osman. | 32. " Ismail Pasha. |
| 12. Mosque of Sultan Bajazed. | 33. Mosques and Houses of Prayer. |
| 13. School Building. | 34. Column of Arcadius. |
| 14. Ieni Khan. | 35. Mosque of Mohammed and Tawkhane Hospital. |
| 15. Khan of the Sultana Valide. | 36. Meidan dschamisi Seraglio. |
| 16. Other Khans. | 37. Mosque of Selim. |

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| 38. Ancient Cisterns. | 54. Mosque Mustaffa Effendi. |
| 39. The Fanal (Lighthouse). | 55. " Sinan Pasha. |
| 40. Tekfur Seraglio, former palace of Constantine the Great. | 56. Palace of Sultana Begum. |
| | 57. " " Valide. |

Suburb of Galata.

Suburb of Pera.

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|---|--------------------------------------|
| 41. Barracks of the Bombardiers. | a. Hotel of the French Embassy. |
| 42. Old Cannon Foundry. | b. " " Austrian " |
| 43. Engineers' School. | c. " " Holland " |
| 44. New Cannon Foundry, with the Administration Buildings. | d. " " English " |
| 45. Magazines and Ropewalks. | e. " " Norwegian-Swedish Embassy. |
| 46. School Building. | |
| 47. Seraglio of the Capudan Pasha. | |
| 48. Magazines and Wharfs. | <i>Scutari.</i> |
| 49. Tower of Galata. | |
| 50. Old Artillery Barracks. | 58. Granaries. |
| 51. New " " | 59. Mosque Shemsi Pasha. |
| 52. Mosque, Coffee Houses, and Fountains. | 60. Ibrik dschamisi. |
| 53. Palace of Beshik-Tash. | 61. Khan of the Sultana Mother. |

4. ST. PETERSBURG (*Plate 37*).

St. Petersburg is one of the most beautiful cities in Europe, not on account of its position, but by merit of its superior plan and architectural features. It is the most important commercial place in the Russian Empire, of which it is also one of the capitals. It is situated between the Lake of Ladoga and the Gulf of Finland, near the mouth of the River Neva. It has a circumference of nearly sixteen miles, with a population of some 450,000, amongst which are only about 150,000 females; there are 120,000 peasants, 75,000 military persons; 25,000 Lutherans, 23,000 Roman Catholics, 8000 Reformed, 2,200 Mohammedans, 570 Jews; 3000 French, 2700 English, 20–25,000 Germans, &c. Of its 8700 houses, 5400 are of wood; there are ten imperial palaces, over 750 government buildings, 304 police stations, 163 churches and chapels, amongst them but twelve Protestant and Roman Catholic. The city is divided into thirteen districts, of which nine lie on the southern bank of the Neva; two form islands, Petrofskoi and Wasiliefskoi-Ostrow, between the Neva and Newka; one lies north of the Neva, and is not yet fully built up; the thirteenth district is the former village of Ochta on the Neva. In all, excepting the last, which has been but recently drawn into the city, the streets are straight and broad. The finest street is the Newsky-perspective, 15,000 feet long, and 140–150 feet broad, abounding in the most brilliant shops. The finest parts of the city are the four Admiralty

Districts, between the Neva and the Fontanka Canal ; in these are situated the Imperial Winter Palace, 450 feet long on the Neva ; in front of it stands the immense column in honor of Alexander I., eighty-four feet high and thirty-six feet thick, wrought of a single mass of granite ; the Hermitage, with a very valuable collection of paintings, and a library of 100,000 volumes ; the Marble Palace, built of granite and coated with marble, and with a copper roof ; the Palaces of the Grand Prince Michael, and of the Duke of Leuchtenberg ; the immense Navy Yard, with workshops for shipbuilding, magazines, and docks. Some of the other numerous public buildings are the Imperial Foundling Hospital for 5000 children ; the Imperial Public Library, with 450,000 volumes and 18,000 manuscripts ; the Royal stables, with accommodations for 1500 horses ; the Taurian Palace, formerly belonging to Prince Potemkin, with a collection of antiquities ; the large bazaar, Gostinnoi Dwor, with arcades and 170 shops ; the Exchange, on the island of Wasiliefskoi-Ostrow, 330 feet long and 246 feet broad, with forty Doric columns, and a hall 136 feet long ; the building of the Academy of Arts ; the fine University building ; the Land and Sea Cadet House, the former for 700, the latter for 350 pupils. The principal churches are St. Isaac's Church, built entirely of marble and metal, with 112 granite columns, 56 feet high, each one cut from a single block, and with a dome 330 feet high and 100 feet in diameter, one of the largest and most magnificent churches in the world ; the Church of Our Lady of Kasan, with marble floor and fifty-six granite columns, together with an external, semi-circular portico of 130 columns ; the Church of St. Nicholas, of two stories, the lower of which can be heated ; St. Peter-Paul's Church, with the imperial vault, in which all the Emperors are entombed, and with a spire, 330 feet high, gilded at the expense of 60,000 ducats ; the Church of the Order of Alexander-Newsky ; also an imperial burying-place, containing the silver tomb of St. Alexander. Of monuments and statues, in addition to those already mentioned, the principal are the bronze equestrian statue of Peter the Great, on a single block of granite, 17 feet high, and weighing 1500 tons ; the monuments of the Marshals Suwarrow, Kutusow, and Barclay de Tolly. Public places of resort are the islands of Chreskowsky, Jelagin, and Kammenoi-Ostrow (or Stone Island), with gardens, walks, parks, &c.

EXPLANATION OF THE PLAN.

| <i>Districts.</i> | | |
|----------------------|---------------------|------------------------------------|
| A. 1. Admiralty's. | A'. 2. Admiralty's. | A'' 3. Admiralty's. |
| A''' 4. Admiralty's. | B. Narwa. | C. Moscow. |
| D. Karetnoi. | E. Rozestwenskoï. | F. Liteinoi. |
| | | G. Wiborg Side. |
| | | H. Petersburg Side. |
| | | I. Wasiliefskoi-Ostrow. |
| | | J. Ochta. |
| | | K. New Holland. |
| | | L. Malysowskoï Island. |
| | | M. Fort of St. Peter and St. Paul. |
| | | N. Stone Bridge. |

Ship Bridges.

- a. Isakieffskoi.
- b. Troitzkoi.
- c. Workresenskoi.
- d. Samsonieffkoi.
- e. Tutschkoff.

Streets and Squares.

- a¹. Newskoy Prospect.
- a. Little Morskoi.
- b. Little Ochta Prospect.
- c. Slonowaia Ulitza.
- d. Dechtiarnaia Ulitza.
- e. Offizerskaia Ulitza.
- f. Bolschoi Woskresenskoi Prospect.
- g. Sergiefskaia Ulitza.
- g¹. Summer Garden.
- g¹¹. Mars' Field, with Suwarrow's Statue.
- h. Kirschnaia Ulitza.
- i. Liteinoi Prospect.
- j. Machawaia Ulitza.
- k. Znamenskaia Ulitza.
- l. Forstadtskaia Ulitza.
- m. Bolotnaia Ulitza.
- n. } Ismailowskoi Prospect.
- o. }
- p. } Bolsch. Sadowaia Ulitza.
- q. }
- r. Bolsch. Meschtschanskaia Ulitza.
- s. Petroffskoi Prospect.
- t. Bolsch. Offizerskaia Ulitza.
- u. Angliskoi Prospect.
- v. Torgowaia Ulitza.
- w. Galernaia Ulitza.
- x. Anglikaia Nabereschnaia.
- y. Bolschoi Morskoi.
- y¹. Wosnesenskoi Prospect.
- z. Admiraltitätskoi Prospect.
- A. Garagowaia Ulitza.
- B. Italienskaia Ulitza.
- B¹. Little Million.
- C¹. Great Million.
- c. Kosewannoï Prospect.
- d. Bolschoi Prospect.

- e. Srednia Prospect.
- f. Maloi Prospect.
- g. Corpusnaia and 1. Line.
- h. Pusskarskoi Prospect.
- i. Bolschoi Prospect.
- j. Kamennoi Prospect.
- k. Maloi Prospect.
- l. Pesotschnoi.
- m. Woskresenskaia Ulitza.
- n. Bolsch. Samsonskoi Prospect.
- o. Botscharnaia Ulitza.

Public Buildings.

- 1. Imperial Marble Palace.
- 2. Imperial Winter Palace.
- 3. Barracks.
- 4. Depart. of the Imperial Pensions.
- 5. Generalty with the Column of Alexander.
- 6. Hotel of the French Embassy.
- 7. Admiralty Building.
- 8. St. Isaac's Church.
- 9. General Post Office.
- 10. Square and Equestrian Statue of Peter I.
- 11. Navy Department.
- 12. Palace of the Senate and Holy Synod.
- 13. New Admiralty Building.
- 14. Imperial Stable.
- 15. Cathedral of Our Lady of Kasan.
- 16. Foundling Asylum.
- 17. Loan Bank.
- 18. Second Gymnasium (School).
- 19. Church of St. Nicholas.
- 20. The large Theatre.
- 21. Engineers' School (the old Michailow Palace).
- 22. Riding School of the Guards.
- 23. Catholic School of St. Catharine.
- 24. Imperial Palace Anischko, Cabinet of the Emperor.
- 25. Imperial Treasury.
- 26. House of the Imperial Orderlies.
- 27. The City Hall.
- 28. The Alexandra Theatre.

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| 28 ¹ . Imperial Library. | 55. Main Custom House. |
| 29. The Pages' Building. | 56. Armenian Church. |
| 30. Bank. | 57. House of Cossacks of the Don. |
| 30'. Gostinnoi Dwor. | 58. Catharine Institution. |
| 31. Church of the Ascension of Christ. | 59. Police Building. |
| 32. Church of the Ascension of St. Mary. | 60. Magazine. |
| 33. School of Civil Engineers. | 61. House of Peter the Great. |
| 34. The Nicholas Market. | 62. Taurian Palace. |
| 35. Church of the Intercession of the Virgin Mary. | 63. Convent of Smolna. |
| 36. New Arsenal and Foundry. | 64. City Hospital. |
| 37. Hospital for the Poor. | 65. Military Hospital. |
| 38. Church of Christ's Glorification. | 66. Convent of Alexander-Newsky, with the Theological Academy. |
| 39. Artillery Department. | 67. Mirror and Glass Works. |
| 40. Imperial Gobelin Manufactory. | 68. Barracks of Cossacks of the Guard. |
| 41. Building of the Guard of Chevaliers. | 69. Sugar Refineries. |
| 42. Church of St. Wladimir. | 70. Institute of the Mining Corps. |
| 43. Nobility Institute of the Imperial University. | 71. Marine Cadet School. |
| 44. Technological Institute. | 72. Academy of Sciences. |
| 45. Trinity Church. | 73. Academy of Arts. |
| 46. Building of the 2d Cadet Corps. | 74. Buildings of the first Cadet Corps. |
| 47. Exercising School. | 75. Custom House Stores. |
| 48. St. Nicholas Church. | 76. Observatory. |
| 49. Chemical Laboratory. | 77. Exchange. |
| 50. Military Hospitals. | 77 ^b . Old Palace of Peter the Great. |
| 51. Veterinary School. | 78. Rope Walks. |
| 52. Medico-Chirurgical Academy. | 79. Brandy Depots. |
| 53. Palace of Grand Prince Michael. | 80. Herring Depots. |
| 54. Imperial Archives. | 81. Botanic Garden. |
| | 82. Military Hospital. |
| | 83. Church of Our Lady of Smolensk. |

5. WARSAW (*Plate 37*).

Warsaw, the capital of the Russian Kingdom of Poland, is situated on the left bank of the Weichsel, and has about 165,000 inhabitants, amongst which are some 38,000 Jews, 7000 Protestants, and 3000 Greeks. About one third of the city, which is about five miles long and two miles and a half broad, is occupied by gardens and open squares. The city itself consists of mean houses (with 1400 stone buildings there are 1700 of wood) and splendid palaces (of these there are no less than 180, public and private). The inner town, divided into the Old and New, is exceeded in beauty by the four suburbs, conspicuous amongst which is that of Praga, situated on the opposite bank of the Weichsel, and with 8000 inhabitants. The principal streets are Honey street, Long street, King's Street, Senator street, &c. The most beautiful squares are Saxony Square, and those of Marieville and of

King Sigismund. The most conspicuous buildings are the Royal, now Imperial Palace, on an elevation; the Palace of the former vice-King; the Saxon Palace; the former Brühl Palace; the Arsenal; the Mint; the Bank; the Post Office; the City Hall; the Great Hospital of the Child Jesus; the Cathedral; the Augustine, Piarist, the Cross and Alexander Churches. There are nineteen churches in all, namely sixteen Roman Catholic, two Protestant, and one Greek. Among monuments, may be mentioned the monument erected to Copernicus in 1830; an iron obelisk in Saxony Square, resting on eight lions, in honor of the Poles who fell in 1830, fighting on the Russian side; before the city, the marble monumental column of King Sigismund II., with the gilt statue of this prince.

EXPLANATION OF THE PLAN.

| <i>Streets.</i> | |
|---------------------------|------------------------------------|
| <i>a.</i> Czerniakowska. | 4. Palace Krasinski. |
| <i>b.</i> Soler. | 5. " Branicki. |
| <i>c.</i> Alexandryjska. | 6. " Radziwillow. |
| <i>d.</i> Marszałkowska. | 7. Rynek Starego-Miacta. |
| <i>e.</i> Twarda. | 8. Palace Mniszkowski. |
| <i>f.</i> Wielopolska. | 10. " Oginski. |
| <i>g.</i> Chłodna. | 11. " Zamoyski. |
| <i>h.</i> Elektoralna. | 12. " Lubomirski. |
| <i>i.</i> Królewska. | 13. Cavalry Barracks. |
| <i>k.</i> Wierzbowa. | 14. Trinity Church. |
| <i>l.</i> Senatorska. | 15. St. Alexander's Church. |
| <i>m.</i> Miodowa. | 16. Lutheran Church. |
| <i>n.</i> Powwale. | 17. Church of the Holy Cross. |
| <i>o.</i> Długa. | 18. Saxon Palace. |
| <i>p.</i> Mostowa. | 19. Riding School. |
| <i>q.</i> Zakroczymska. | 20. Koosarzy Mirowskie (Barracks). |
| <i>r.</i> Gwardyjska. | 21. Finance Department. |
| <i>s.</i> Fulary. | 22. Arsenal. |
| <i>t.</i> Franciszkanska. | 23. Artillery Barracks. |
| <i>u.</i> Leszno. | 24. Guard Barracks. |
| <i>v.</i> Dzika. | 25. Dominican Church. |
| <i>x.</i> S. Janska. | 26. Royal Palace. |
| <i>y.</i> Nalewsky. | 27. Mint. |
| | 28. Krakowskie Przedmiescie Suburb |
| | 29. Gymnasium (School). |
| | 30. Grzybowa. |
| | 31. Post Office. |
| | 32. City Hall. |
| | 33. Bank. |
| | 34. Theatre. |
| | 35. Child Jesus' Hospital. |
| <i>Public Buildings.</i> | |
| 1. Palace Ossolinski. | |
| 2. Palace Radzinski. | |
| 3. The Saxony Garden. | |

6. BERLIN (*Plate 38*).

Berlin, the first city of the Prussian Monarchy, lies in the former Mark, and present Province of Brandenburg, in a perfectly level, sandy, and unattractive region, on the Spree. Its present population is 400,000, amongst which are 7000 Jews, 5-6000 Roman Catholics, 5500 French Reformed, 850 Bohemian Protestants, and the rest Evangelical. It is incontestably one of the most beautifully built cities in Europe, and, in its newer quarters, has a large number of superb edifices. It is divided into the following six parts: Berlin Proper or Old Berlin, Old and New Cologne (the oldest parts of the city), Friedrichstadt, Friedrichswerder, Dorothea- or Neustadt, Friedrich-Wilhelms-stadt; to these must be added the Königsstadt, the Spandau and Stralau quarters, together with the Oranienburg, the Rosenthal, the Potsdam, and the Köpenick Suburbs (the latter now Luisenstadt). The Friedrichs- and the Neustadt are especially distinguished by broad and perfectly straight streets. The most conspicuous are the Linden, with a fourfold avenue of lindens, 2000 paces long and 160 feet broad; the Friedrichsstrasse, 8250 paces long; Königsstrasse, 2170 paces; Wilhelmsstrasse, 4650 paces; the Leipzigerstrasse, and the new Friedrichsstrasse. The most beautiful squares are the Paris square, Wilhelmsplatz, with six Marble Statues of Prussian Generals of the Seven Years' war; the Belle Alliance Platz, with a column supporting a Victory, in commemoration of the twenty-five years' peace of 1840; the Lustgarten; the square in front of the Arsenal; the Opera square, with the statues of Blücher, Scharnhorst, and Bülow; the Gendarmen Mark, 440 paces long; the Dönhof, the Leipzig, and the Schlossplatz. Among the gates, the Brandenburg Gate, at the end of the Linden, deserves especial mention; it consists of twelve Corinthian columns of forty-four feet in height and five in diameter; it is 195 feet broad, 64 feet high, and built after the model of the Propylæa at Athens; upon it stands the celebrated four span of horses with the Victoria. Of the forty bridges across the Spree (among them six of iron and eighteen of stone), the most conspicuous are the Long Bridge, with the bronze equestrian statue of the great Elector; and the new Palace Bridge. Of the thirty-three churches, none deserve especial notice; the most beautiful are the recently restored Convent Church, and the new Friedrichswerder Church; in the place of the old unsightly Cathedral, built in 1748, a much larger is to be erected, surrounded by a Campo Santo, containing the burial-place of the Royal House, and decorated with frescoes by Cornelius. The most conspicuous public buildings are the King's Palace, 460 feet long, with four courts, 500 chambers, and a beautiful dome; the Arsenal, 280 feet long; the Opera House; the Royal Library (containing over 250,000 volumes, and 4600 manuscripts); the University Building; the Museum of Art and Antiquity (in a former bed of the river, placed on 8000 piles), a quadrangle 276 feet long, 179 feet deep, to which has been recently added a second Museum (not yet completed); the Mint; the Architects' School; the Royal Guard House; the building of the Academy of Sciences; the

Theatre ; the new Royal Veterinary School, &c. In the vicinity of Berlin the Thiergarten is a very favorite and exceedingly beautiful promenade ; in this, a monument to Friedrich Wilhelm III. has been recently erected. Another remarkable monument of cast iron, in commemoration of the struggle of 1813 to 1815, presents itself on the Kreuzberg before the Halle Gate.

EXPLANATION OF THE PLAN.

Divisions of the City.

- A. Berlin Proper or Old Berlin.
- B. Old and New Cologne.
- C. Luisenstadt, formerly Köpenicker Vorstadt.
- D. Friedrichsstadt.
- E. Friedrichswerder.
- F. Dorothea, or Neustadt.
- G. Friedrich-Wilhelm's Stadt.
- H. Spandau Quarter.
- I. Königsstadt.
- K. Stralau Quarter.
- L. Oranienburger Vorstadt (Voigtland).
- M. Rosenthaler Vorstadt (Neuvoigtland).
- N. Potsdamer or Friedrichsvorstadt.

Public Buildings.

- 1. Royal Palace.
- 2. King's private Palace.
- 3. Military Government Hall.
- 4. Arsenal.
- 5. University.
- 6. Royal Academy.
- 7. Library, and Palace of the Prince of Prussia.
- 8. Royal Opera House.
- 9. St. Hedwig's Church.
- 10. French Reformed Church.
- 11. Cathedral.
- 12. Police Prison.
- 13. Royal Mint.
- 14. Werder Church.
- 15. Royal Museum.
- 16. Artillery Barracks.
- 17. Frederick William's Institute.
- 18. Grand Lodge ; opposite St. Dorothea Church.
- 19. Royal Stables.
- 20. Warehouse-, and Island-Buildings
- 21. St. Nicholas Church.
- 22. Civil Government Hall.
- 23. Parish Church.
- 24. Royal Cadet House.
- 25. Convent Church.
- 26. French Church.
- 27. City Hall.
- 28. General Post Office.
- 29. Military School.
- 30. Joachimsthal Gymnasium : School.
- 31. Garrison Church.
- 32. St. Mary's Church.
- 33. Monbijou Palace.

Public Squares (Plätze).

- A. Opernplatz.
- B. Gendarmenmarkt, with the Royal Theatre.
- C. Schlossplatz.
- D. Lustgarten.
- E. Leipziger Platz.
- F. Wilhelms Platz.
- G. Pariser Platz.
- H. Dönhof Platz.
- I. Belle Alliance Platz.
- K. Ascanischer Platz.
- L. Hausvoigtei Platz.
- M. Alexander Platz.
- N. New Market.
- O. Stralau Platz.

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|---|---|
| 34. New Post Office. | 74. War Department. |
| 35. Barracks of the 2d Regiment of Guards. | 75. Palace of Prince Albert. |
| 36. Old Post Office. | 76. Palace of Prince Radziwil. |
| 37. Stables of the Mounted Artillery Guard. | 77. Ministry of Justice. |
| 38. Barracks of the Infantry Guard. | 78. Prince Frederick's Palace. |
| 39. Old Charité (hospital). | 79. Artillery School and Police Office. |
| 40. Veterinary School. | 80. Artillery Workshops. |

41. New Charité (hospital).
42. Hospital of the Invalids.

Bridges (Brücken).

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|---|------------------------|
| 43. Royal Iron Foundry. | a. Oberbaum. |
| 44. House of Artillery Practice. | b. Schilling's Bridge. |
| 45. St. Elizabeth Church. | c. Jannovitz " |
| 46. St. Sophia Church. | d. Waisen " |
| 47. Royal Lithographic Institute. | e. Fischer " |
| 48. Barracks of the Regiment of Emperor Alexander. | f. Long " |
| 49. St. George Church. | g. Cavalry " |
| 50. Königsstadt Theatre. | h. New Fredericks " |
| 51. Barracks of the Regiment Emperor Francis. | i. Eberts " |
| 52. Forage Magazine. | j. Weidendammer " |
| 53. Provision Magazine. | k. Marschall's " |
| 54. Frederick William Hospital. | l. Unterbaum " |
| 55. Royal Salt Warehouse. | m. König's " |
| 56. Barracks of the Pioneer and Guard Sharp Shooters. | n. Kunowski " |
| 57. St. Jacob's Church. | o. Spandau " |
| 58. St. Sebastian Church. | p. Stralau " |
| 59. Barracks of the Regiment Emperor Francis. | q. Schloss " (large). |
| 60. Chancery of State. | r. Schloss " (small). |
| 61. Hospital Church. | s. Jungfern " |
| 62. Jerusalem Church. | t. Gertrauden " |
| 63. Military Prison. | u. Grünstrassen " |
| 64. Court of Justice. | v. Rosstrassen " |
| 65. } Barracks and Stables of the | w. Island " |
| 66. } Dragoons of the Guard. | |

Streets (Strassen).

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| 67. Barracks of the Cuirassier Guards. | 1. Unter den Linden. |
| 68. Barracks of the Hulan Guards. | 2. Friedrich's Strasse. |
| 69. Observatory. | 3. Louisen " |
| 70. Bohemian Church. | 3 ^d . Karls " |
| 71. Trinity Church. | 4. Wilhelm " |
| 72. Foreign Department. | 5. Leipziger " |
| 73. Department of the Royal House. | 6. Linden " |
| | 7. Mauer " |
| | 8. Charlotten " |

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| 9. Markgrafen Strasse. | 44. Kaiser Strasse. |
| 10. Jerusalem " " | 45. Grosse Frankfurter " " |
| 11. Koch " " | 46. Rosengasse. |
| 12. Zimmer " " | 47. Landsberger Strasse. |
| 13. Schützen " " | 48. Neue Königs " " |
| 14. Krausen " " | 49. Golnowsgasse. |
| 15. Kronen " " | 50. Weber Strasse. |
| 16. Mohren " " | 51. Prenzlauer " " |
| 17. Tauben " " | 52. Kleine Alexander " " |
| 18. Jäger " " | 53. Alte Schönhäuser " " |
| 19. Französische " " | 54. Rosenthaler " " |
| 20. Behren " " | 55. Neue Schönhäuser " " |
| 21. Niederwall " " | 56. Münz " " |
| 22. Kur " " | 57. Alexander " " |
| 23. Oberwall " " | 58. Linien " " |
| 24. Dorotheen " " | 59. Hirtengasse. |
| 25. Mittel " " | 60. August Strasse. |
| 26. Wall " " | 61. Oranienburger " " |
| 27. Alte Jacobs " " | 62. Kleine Hamburger " " |
| 28. Ritter " " | 63. Gips " " |
| 29. Orangen " " | 64. Sophien " " |
| 30. Commandanten " " | 65. Grosse Hamburger " " |
| 31. Stallschreiber " " | 66. Königs " " |
| 32. Sebastians " " | 67. Stralauer " " |
| 33. Dresdener " " | 68. Neue Friedrichs " " |
| 34. Schäfergasse (alley). | 69. Kloster " " |
| 35. Köpeniker Strasse. | 70. Juden " " |
| 36. Schlesische " " | 71. Spandauer " " |
| 37. Neander " " | 72. Heilige Geist " " |
| 38. Brücken " " | 73. Post " " |
| 39. Holzmarkt " " | 74. Breite " " |
| 40. Mühlen " " | 75. Brüder " " |
| 41. Lange Gasse (alley). | 76. An der Friedrichsgracht. |
| 42. Alexander Strasse. | 77. Neu-Cölln on the Water. |
| 43. Blumen " " | |

7. VIENNA (*Plate 39*).

Vienna, or Wien, the beautiful and lively capital of Austria, is situated at the foot of the Wiener Mountain, on the right bank of the Danube, which is here divided into three arms, and also on a canal, and on the Wien. With its suburbs it is about sixteen miles in circumference, and includes 9000 houses, with 410,000 inhabitants (not counting the military). Of these, about 12,000 are Protestants, and 600 Greeks. The inner city, or city proper, which forms only the tenth part of the whole, is separated from the thirty-four suburbs by the Esplanade or glacis, a surface 600 paces broad

intersected by meadow lands and avenues, which occupies the place of the former fortifications: a further separation is effected by ramparts forty to sixty feet high, with eleven bastions (the latter partly changed into public gardens and promenades). All the suburbs, however, lie within the line, a wall twelve feet high and 42,500 feet long. Although the inner town (with 12 gates, 127 streets, 19 squares, 1300 houses, and 64,000 inhabitants) is irregularly built, it has many beautiful buildings, and numerous palaces. The finest squares are: the Burg or Paradeplatz, 950 feet long; the Hof, 400 feet long, with a marble column and two fountains; the High Market, with a marble monument in the form of a temple, representing the nuptials of Joseph and Mary; the Franzensplatz, with a monument to Emperor Francis I.; the Grahen, a street 100 feet broad, with the Marble Trinity Column, 66 feet high; the Josephsplatz, with an equestrian statue of Emperor Joseph II., 33 feet high; the New Market, with a beautiful basin, and the Freiung, with the new fountain, ornamented by Schwanthaler's allegorical representations of the four principal rivers. The principal buildings are: the Burg or imperial residence, 1200 feet long, with three courts, and containing in one hall, 240 feet long and 84 broad, the Imperial Library, with 360,000 volumes and 12,000 manuscripts; the great Imperial Cabinet of Natural History in 4 halls; also a collection of 300,000 engravings, antiquities, works of art, &c., 32,000 coins and medals, and the Treasury; the Riding School near the Burg; the Castle of Arch Duke Charles; the Hofkammer; the Bank; the War Department, and the University Buildings; and about thirty noteworthy private palaces. Of the fifty-six churches and chapels (among them only two Protestant and three Greek) are St. Stephen's Church, 330 feet long, 216 broad, with a spire 432½ feet high (containing a bell weighing 35,400 pounds), 38 marble altars, 31 windows, and many tombs, amongst them those of Prince Eugene of Savoy, and of Emperor Frederick III.; the Augustins' Church, with the celebrated monument to the Grand Duchess Christina, by Canova; the Church of the Redemptorists at Maria-Stiegen, with a spire 180 feet high, ending in a calyx and surmounted by a cross; the Capucin Church, with the tombs of the imperial family; the Italian Church, and the Church of St Michael.

Of the suburbs, which are divided into eight police districts, the most beautiful are the Leopoldstadt and Josephstadt, as also the Jägerzeil and the Taborstrasse; the most extended, however, are the Wieden, with 33,000 inhabitants, the Landstrasse with 26,000, the Leopoldstadt with 23,000 the Schottenfeld with 21,000, and Gumpendorf with 13,000. The principal buildings of the suburbs are the Imperial stable, 600 feet long, capable of containing 400 horses; the Palace Belvedere, containing the valuable picture gallery, and in an adjoining building the Ambrase collection of armor and works of art of the middle ages; the two Liechtenstein Palaces, one of them with a rich gallery of paintings; the Esterhazy and the Auersperg Palaces; the Stahremberg Free-House, with 300 residences and 2200 inhabitants; the Medico-Chirurgical, the Engineer and the Nobles' Academies; the Invalid Hospital for 800 men; the Polytechnic Institute;

the Public Hospital, with 111 apartments and 2000 beds; the Cannon Foundry; the great steam Rolling Mill; the Porcelain Manufactory. The Church of St. Borromæus in the suburb Wieden, built in the Italian style, with domes, portals, paintings, and the monument of Collin, next to the Church of St. Stephen, is the most beautiful in Vienna.

The River Wien is spanned by two stone bridges, one plank, and one suspension bridge; also by one suspension and several simple wooden footpaths; over the Wiener Donau Canal are six bridges, among them three suspension bridges; over the Danube, which converts the Leopoldstadt into an island, are several wooden yoke bridges. The southern suburbs are provided with water by the aqueduct from Hüttendorf to Vienna, which feeds twelve wells, as also by the new Emperor Ferdinand's aqueduct, which draws up the water of the Danube at Nursdorf, by means of seven steam engines; in addition to these sources of supply, there are forty Artesian wells in different parts of the city.

The principal promenades are: 1, the Imperial Garden, with a menagerie and hothouses 568 feet long, containing a conservatory 72 feet long; 2, the Prater and the Augarten in the Leopoldstadt; 3, the Volksgarten, with a temple containing a statue of Theseus, by Canova; 4, the Gardens of Princes Schwarzenberg and Liechtenstein.

Vienna has two railroad depots: one in the north, on the island of Leopoldstadt, not far from the Praterstern, from which the Emperor Ferdinand's Northern Railroad takes its origin; and one in the south, not far from the Belvedere line, from which the roads go out to Gloggnitz and Bruck.

EXPLANATION OF THE PLAN.

Suburbs.

- A. Leopoldstadt.
- B. Landstrasse.
- C. Wieden.
- D. Mariahilf.
- E. Neubau.
- F. Josephstadt.
- G. Alsergrund.
- H. Rossau.

- E. Freieung.
- F. Graben.
- G. Minoritenplatz.
- H. Neuer Paradeplatz.
- I. Josepfsplatz
- K. Ballplatz.
- L. Volksgarten.
- M. Hofgarten.
- N. Kirchenplatz.
- O. Swine Market.
- P. Botanical Garden.
- Q. Fruit Market.
- R. Grain Market.

Squares and Gardens.

- A. St. Stephansplatz (with the Cathedral).
- B. The Hof.
- C. High Market.
- D. Jew's Place.

Bastions and Gates (Basteien u. Thore).

- 1. Biberbastei.

2. Rothe Bastei.
3. Gonzaga “
4. Fischerthor.
5. Neue Thorbastei.
6. Schottenbastei.
7. Schottenthor.
8. Mölker Bastei.
9. Kaiser-Franzthor.
10. Löwelbastei.
11. Burgthor.
12. Augustinerbastei.
13. Kärnthnerthor.
14. Wasserkunstbastei.
15. Seilerstetterthor.
16. Stubenthorbastei.
17. Stubenthor.
18. Dommikanerbastei.
19. Hauptmauththor (Customhouse Gate).

Public Buildings.

- a. Imperial Burg.
- b. University.
- c. Arsenal.
- d. Archbishop's Palace.
- e. Infantry Barracks.
- f. Mint Building.
- g. Court Opera House.
- h. House of Invalids.
- i. Custom House.
- k. Belvedere.
- k². Schwarzenberg Palace.
- l. German Nobleguards.
- m. Foundry.
- n. Theresianum.
- o. Freehouse.
- p. Imperial Stables.
- q. St. Charles Church.
- r. Polytechnic Institute.
- s. Barracks.
- t. Theatre on the Wien.
- u. Italian Nobleguards.
- v. Hungarian Nobleguards.
- w. Criminal Court.
- x. Public Hospital.
- y. Military Hospital.

- z. Insane Asylum.
- aa. Asylum.
- bb. Porcelain Manufactory.
- cc. Orphan Asylum.

Streets (Strassen) and Alleys (Gassen).

- aa. Herren Gasse.
- bb. Augustiner “
- cc. Kärnthner Strasse.
- dd. Singer “
- ee. Lichtensteg.
- ff. Wipplinger Strasse.
- gg. Hohe Brücke.
- hh. Renn Gasse.
- ii. Wallner “
1. Jägerzeile.
2. Prater Strasse.
3. Tabor “
4. Zur Franzensbrücke.
5. On the Tabor.
6. Herren Gasse.
7. Lilienbrunn “
8. Neue “
9. Donau Strasse.
10. Augarten “
11. Prater “
12. From Augarten.
13. On the Glacis.
14. Land Strasse, Haupt Strasse.
15. Halter Gasse.
16. Erdberg “
17. Ritter “
18. Anton “
19. Raben “
20. Waag “
21. Paulus Grund, Haupt Strasse.
22. Ungar Gasse.
23. Renntrög “
24. Feld “
25. St. Pauli Höhe.
26. Paulus Grund.
27. Kirchen Gasse.
28. Stern “
29. Gärtner “
30. Weissgerber Haupt Strasse.

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| 31. Lower Garten Gasse. | 78. Burg Gasse. |
| 32. On the Gestätte. | 79. Wendelstadt. |
| 33. On the Danube. | 80. Lange Keller Gasse. |
| 34. Renntrog Gasse. | 81. Ritter “ |
| 35. Fasan “ | 82. Kandel “ |
| 36. Heu “ | 83. Kirchen “ |
| 37. Favoriten Linien Strasse. | 84. Lamm “ |
| 38. Weiringer Gasse. | 85. Fuhrmann's “ |
| 39. Linien “ | 86. Feld “ |
| 40. Blechernes Thurmfeld. | 87. Ziegler “ |
| 41. Meyerhöfel Gasse. | 88. Neubau “ |
| 42. Old Wiedner Haupt Strasse. | 89. On the Platzl. |
| 43. Matzleinsdorfer Haupt “ | 90. Neustift. |
| 44. Mittersteig. | 91. Stadt Gasse. |
| 45. Sieben Brunnen Gasse. | 92. Kaiser Strasse. |
| 46. Sieben Brunnen Meadow. | 93. Roverani Gasse. |
| 47. New Wiedner Haupt Strasse. | 94. Lerchenfelder Haupt Strasse. |
| 48. Gries Gasse. | 95. Lerchenfelder “ |
| 49. Margarethen Lange Gasse. | 96. Josephstädter Kaiser “ |
| 50. Lange “ | 97. Lange Gasse. |
| 51. Hundsthurmer Linien “ | 98. On the Glacis. |
| 52. Schloss “ | 99. Strozische Grund Haupt |
| 53. Ziegelofen “ | Strasse. |
| 54. Kugel “ | 100. Neu Gasse. |
| 55. Reinprechtsdorfer Strasse. | 101. Allee “ |
| 56. Grosse Neue Gasse. | 102. Benno “ |
| 57. Trappel “ | 103. Albert “ |
| 58. Penzinger Strasse. | 104. Feld “ |
| 59. Mariahilfer Haupt Strasse. | 105. Alser Haupt Strasse. |
| 60. Leimgrube. | 106. Magazin Gasse. |
| 61. Roth Gasse. | 107. Floriani “ |
| 62. Drei Hufeisen Gasse. | 108. Herren “ |
| 63. On the Wien. | 109. Piaristen “ |
| 64. Schleifmühl Gasse. | 110. Neue Schotten “ |
| 65. Gumpendorfer Haupt Strasse. | 111. On the Burg Strasse. |
| 66. Windmühl Gasse. | 112. On the Alsterbach. |
| 67. Grosse Stein “ | 113. Spital Gasse. |
| 68. Stumper “ | 114. Währinger “ |
| 69. Müller “ | 115. Fuhrmanns “ |
| 70. Linien “ | 116. Lange “ |
| 71. Zwerg “ | 117. Drei Mohren “ |
| 72. Schmalzhof “ | 118. Schmied “ |
| 73. Grosse Schmiede “ | 119. Bramer “ |
| 74. Schwaben “ | 120. Juden “ |
| 75. Sieben Stern “ | 121. Porzellan “ |
| 76. Kleine Stift “ | 122. Hauptplatz. |
| 77. Spittelberg. | 123. Gestätten Gasse. |

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| 124. Nussdorfer Haupt Strasse. | 127. Grosse Kirchen Gasse. |
| 125. Lichtenthaler " " | 128. Schimmel Gasse. |
| 126. Kirchen Gasse. | |

8. LISBON (*Plate 40*).

Lisbon, or Lisboa, the capital of the kingdom of Portugal, is situated on the Tagus, being extended for about five miles along its bank. It includes a population of about 280,000 souls, amongst which are a goodly number of negroes and mulattoes. In point of beauty of situation it competes with Naples, Constantinople, Genoa, and Stockholm. It has neither walls nor gates, but incloses three hills, as also numerous gardens, and even some fields. The north and east quarters of the town are irregularly built, and contain mostly narrow, crooked, and in part steep, streets. On the other hand, however, the New City, built up since the great earthquake of 1755, is equally conspicuous for its regularity and beauty. Here we find three great squares: the Praza do Comercio, or Trade Market, 600 feet long, adorned, in addition to the brazen equestrian statue of Joseph I., by a number of splendid buildings, such as Library, Exchange, Custom House, Government Buildings, Arsenal, India House, &c.; also the Rocio, 1800 feet long, and the Praza do Figueira or Fruit Market, planted with trees and filled with booths; the Praza do Polerim, &c. In addition to the buildings already named, there are the Opera House, City Hall, Arsenal, the College of the Nobility, the Corn Hall, the Cannon Foundry, the Prison (Limoeiro), the Treasury, &c. The numerous churches are neither large nor beautiful, although generally adorned to a great extent internally; the Patriarchal Church, by its elevation on a hill, towers above all the rest, and the Church of St. Rochus is worthy of note, on account of its splendid chapel built by John V. The Royal Palace lies in the hamlet of Belem, now embraced within the city. A masterpiece of architecture is seen in the marble aqueduct, built by John V., which supplies the city with water; it consists of thirty-five arches, which carry the water for 2400 feet across the valley of Alcantara: the highest of these arches is over 230 feet in elevation. The city itself is without fortifications; a remnant of antiquity is met with in the Moorish Castle on the highest hill in the city, in which are kept the Archives, and a House of Correction. The extensive and safe harbor is protected by several forts: Fort St. Juliao, Torre do Buzio, Belem, and St. Sebastiao.

EXPLANATION OF THE PLAN.

| <i>Squares.</i> | | C. Praça (square) | Rato. |
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| | | D. " | Romulares. |
| A. Praça (square) | Alcantara. | E. " | Rocio. |
| B. " | Amorciras. | F. " | Allegria. |

- G. Largo Passião Publico.
H. Praça S. Domingo.
I. Largo Carmo.
K. Praça Figueira.
L. Paço da Rainha.
M. Praça or Campo de Santa Clara.
N. Largo S. Vincente.
O. Praça Pelourinno.
P. " das Flores.
Q. Largo do Convento da Graça.
R. " do Socorro.
S. " do Outeirinho.
T. Porta do Sol.
U. Largo do Loreto.
V. " Quintella.
W. Praça do Comercio.
X. Public Promenade (Passeio publico).
Y. Largo Conde Barão.
Z. Square in front of the Castle and Convent of Santa Cruz.

Streets (Ruas).

- a. Rua Augusta.
b. " da Magdalena.
c. " nova del Rey.
d. " Santa Julia.
e. " da Conseição.
f. Traversa de San Nicolao.
g. " da Victoria.
h. " da Assumpção.
i. " de Santa Justa.
j. Rua dos Martyres.
k. " das Flores Largo.
l. " de San Paulo.
m. " da Boa Vista.
n. do Marquez de Abrantes.
o. " de S. Francisco de Paula.
p. " do Sacramento.
q. " do Livramento.
r. " de Buenos-Ayres.
s. Calçado do Estrella.
t. Rua do Quelhas.
u. " da Esperança.
v. " do Poes Negros.

- w. Rua de San Bento.
x. Largo do Calhariz.
y. Rua do Monho de Vento.
z. " da Salitre.
aa. " de Santa Martha.
bb. Careira dos Cavallos.
cc. Rua do Sol do Rato.
dd. Costa do Castello.

Public Buildings.

1. Palacio (Palace) de Nostra Sennora Necessidades.
2. Old Fort on the Tagus.
3. Armarens do Polvora.
4. Convento et Igreja (Convent and Church) dos Barb. da Bo Morte.
5. Convento do Caraço de Jesus.
6. " da Estrella.
8. " S. Isabel.
9. " de S. Bento.
10. " dos Inglezinhos.
11. " da Esperança.
12. " dos Paulistes.
13. " de Jesus.
14. Collegio des Inglezes (of the English).
15. Convento et Igreja da Trindade.
16. " do Carmo.
17. " Cara da Misericordia.
18. Palacio da Inquisizione.
19. Convento et Igreja de S. Francisco.
20. Church San Roque.
21. " San Loretto.
22. " San Paulo.
23. Alfandega et Aduana (Custom House).
24. Convento da Graça.
25. Nostra Sennora do Monte.
26. Convento S. Vicente de Fora.
27. " do Santa Clara.
28. Fundição de Baixo.
29. Palacio Bemposta.
30. Igreja do Coração de Jesus.

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| L. Piazza del Real Palazzo. | gg. Strada dell' Infrascata. |
| M. Largo del Castello. | hh. " Monte Santo. |
| N. " Santa Maria a Capella. | ii. " de' Sette dolori. |
| O. " del Vasto. | kk. " S. Polito. |
| P. " dello Spirito Santo. | ll. " di Chiaja. |
| Q. Piazza del Gesù Nuovo. | mm. Chiaja. |
| R. " di S. Domenico. | nn. Strada Monte di Dio. |
| S. " della Carità. | oo. Salita del Vomero. |
| T. " della Vittoria. | pp. Strada di Piedigrotta. |
| | qq. " Santa Catterina. |
| | rr. " S. Teresa. |

Streets.

- a. Strada Nuova di Capo di Monte.
- b. " arena della Sanità.
- c. " de' Cristallini.
- d. " delle Vergini.
- e. " Foria.
- e'. " S. Carlo all' Arena.
- f. Fossi di Ponte nuovo.
- g. Strada del Borgo di S. Antonio Abbate.
- h. Strada Carbonara.
- i. " dell' Orticello.
- i' i'. " di Tribunali.
- k. " S. M. Constantinopoli.
- l. " l'Anticaglia.
- m. " Trinità maggiore.
- n. " Nolana.
- o. Sellarie Pennino.
- p. Strada Borgo di Loreto.
- q. " Nuova.
- r. Molo Piccolo.
- s. Posta Strada di Porto.
- t. Strada Lanzieri.
- u. " Medina.
- v. " San Carlo.
- w. " Montoliveto.
- x. " Santa Anna de' Lombardi.
- y. Calata Trinità maggiore.
- z. Strada Lucia.
- aa. " del Gigante.
- bb. " Toledo.
- cc. " S. Teresa.
- dd. " Mater Dei.
- ee. Salita Gonfalone.
- ff. Strada della Salute.

Public Buildings.

- 1. Palazza del Rè.
- 2. " Vecchio.
- 3. Teatro San Carlo.
- 4. San Francesco di Paola.
- 5. Palazzo Francavilla.
- 6. L'Ascensione a Chiaja.
- 7. Pizzofalcone et Tipografia Reale
- 8. Quartiere (Barracks).
- 9. Ministeri di Stato.
- 10. Ufficio della Posta.
- 11. Posta.
- 12. Dogana.
- 13. Banco delle due Sicilie.
- 14. Teatro Nuovo.
- 15. S. Pietro Martire.
- 16. Ospedali la Trinità.
- 17. San Martino.
- 18. Bagni.
- 19. Chiesa del Carmine.
- 20. S. Agostino della Zecca.
- 21. Vullo dell' Annunciata.
- 22. Palazzo Tribunali.
- 23. S. Marcellino.
- 24. Università.
- 25. Santa Chiara.
- 26. S. Domenico maggiore.
- 27. Banco dello Spiritu Santo.
- 28. San Paolo.
- 29. Duomo.
- 30. Incurabile Ospedal.
- 31. Collegio de' Med. et de' Chirurg
- 32. Museo Borbonico.

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| 33. Sacramento Ospedal. | 36. Villa Marchese Tomasi. |
| 34. San Giovanni a Carbonara. | 37. San Gennaro o le Catacombe. |
| 35. Reale Collegio de' Miracoli. | 38. Reclusorio (House of Correction). |

10. ROME (*Plate 41*).

This ancient city, once the capital of the most powerful nation on the earth, and now the capital city of the States of the Church, is situated on the Tiber, about fourteen miles from where it discharges into the sea. It is fourteen to twenty miles in circumference, and has a population of about 160,000, amongst which are over 6000 ecclesiastics, monks, and nuns, and about 4000 Jews. Its walls still inclose the seven ancient hills, the Palatine, Capitoline, Quirinal, Cœlian, Aventine, Viminal, and Esquiline. The principal of the public squares are : the Capitol Square, with the gilt equestrian statue of Marcus Aurelius, and the statues of Castor and Pollux, together with the Palace of the Senate, the Capitoline Museum, and the Palace dei Conservatori ; 2, the Piazza (square) del Popolo, with the beautiful churches de' Miracoli and di Monte Santo, as also with an Egyptian obelisk eighty-two feet high ; 3, Piazza Colonna, with the column of Antonine, and the Palaces Chigi and Spada ; 4, the Piazza del Monte Citorio, with the obelisk of the Sun and the Palace of Justice ; 5, the Piazza di S. Pietro, in front of St. Peter's, with the Custom House ; 6, the Piazza Rotonda, with the Pantheon ; 7, the Piazza Navona, an ancient circus, with the Church of St. Agnes, and three fountains ; 8, the Piazza della Trinità del Monte ; 9, the Piazza di Monte Cavallo, with the palace of the Pope (Quirinal), two antique horses, and the Palace della Consulta. The ancient Forum is now covered to a depth of thirty feet with rubbish, and is called Campo Vaccino (Cowmarket). Rome's three principal streets are the Corso, a straight line for 2700 paces, the Via Ripetta, and the Via Babbuina. Among the 341 churches and chapels, stands pre-eminent the celebrated St. Peter's, 640 feet long, 470 feet broad in the cross, 408 feet high in the spire, and with a dome 220 feet high in the interior, with twenty-nine altars and innumerable statues ; a still more gorgeous church, although of less size, is that of St. John in the Lateran, with 335 columns, the Parish Church of the Pope, and the principal church of Catholic Christianity ; other churches are St. Mary's Church, or the ancient Pantheon ; the Church of Sta. Maria Maggiore, with 40 columns of granite and marble ; Trinità del Monte, with a beautiful flight of steps ; Santa Maria, in Trastevere, the oldest church in Rome, &c. Among the palaces may be mentioned : the Vatican, connected with the Castle of St. Angelo by a covered way ; it is 1200 feet long, 1000 feet broad, with twenty-two courts, and several thousand chambers, containing countless treasures of books, manuscripts, records, antiquities, and works of art ; the Quirinal, residence of the Pope ; the Palaces Pamfili, Barberini, Aldobrandini, Spada, Colonna, Borghese, Caffarelli, Braschi, Orsini, Corsini, Farnese, &c., all remarkable for their size, architecture, or collections of art. Of the innumerable ruins, from the times of the ancient Romans, some

of the principal are : the Coliseum or Amphitheatre of Titus, 560 feet long, 472 broad, 154 high, capable of seating 80,000 persons ; the Column of Trajan, 141 feet high, 12 feet thick, composed of 34 blocks of marble ; the marble column of Antonine, 117 feet high ; eleven obelisks (the largest 115 feet high, 9 feet thick, of red granite) ; the aqueducts, of which three still supply the city with water ; the Baths of Caracalla, Diocletian, and Titus ; the Pyramid of Cestius, 126 feet high (with the Protestant burying-ground in front). The subterranean passages called Catacombs, and extending to a great distance under ground, are very interesting ; originally stone quarries, they were subsequently used as burial-places and places of worship. Rome has numerous beautiful fountains, the finest of which are the Fontana Trevi or Vergine, Fontana di Tritone, Fontana dell' Acqua Felice, and the spring on the Piazza Navona. Among the educational institutions are the University and the Collegio Romano, with an observatory and a botanic garden. The chief among charitable institutions are the immense Hospital of the Holy Ghost, and the Hospital of St. Michael, for 230 old men, 100 women, 480 boys, and 520 girls.

EXPLANATION OF THE PLAN.

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| A. Piazza di S. Pietro. | 19. Piazza di Ponte. |
| B. " del Popolo. | 20. Teatro Tordinone. |
| C. " Navona. | 21. Monte Giordano. |
| D. " de' Capucini. | 22. Piazza Sforza. |
| E. " degli Apostoli. | 23. Carcere. |
| F. " de' Termini. | 24. Statua di Pasquino. |
| G. " della Trinità de' Monti. | 25. Cancelleria. |
| 1. Mausoleo di Adriano. | 26. Sapienza. |
| 2. Ruins of the Vatican Bridge. | 27. Teatro della Valle. |
| 3. Ospedale di Santo Spirito. | 28. Chiesa di S. Eustachio. |
| 4. Piazza di Santa Marta. | 29. Panteon. |
| 5. Covered way from the Vatican to the Castle of St. Angelo. | 30. Collegio Romano. |
| 6. Palazzo Farnese. | 31. Piazza della Minerva. |
| 7. Piazza di San Francesco. | 32. Dogana. |
| 8. Ospizio di S. Michele. | 33. Monte Citorio. |
| 9. Arsenale. | 34. Teatro Capranica. |
| 10. Ospedale di San Giacomo. | 35. Piazza Colonna. |
| 11. Mausoleo di Augusto. | 36. Fontana di Trevi. |
| 12. Teatro Aliberti. | 37. Piazza della Pilotta. |
| 13. Piazza di Spagna. | 38. " di Monte Cavallo. |
| 14. " Mignanelli. | 39. Palazzo Pontefico. |
| 15. " Nicosia. | 40. Piazza di Venezia. |
| 16. " Silvestro. | 41. Giardino Colonna. |
| 17. " Barberini. | 42. Reservoir of the Baths of Diocletian. |
| 18. House of Sallust and Temple of Venus. | 43. Aqueduct. |

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| 44. Basilica di Santa Maria Mag- giore. | <i>i.</i> Borgo Pio. |
| 45. Terme (Bagni) di Paolo Emilio. | <i>k.</i> " Nuovo. |
| 46. Colonna e Basilica del foro Trajano. | <i>l.</i> " Vecchio. |
| 47. Palazzo Farnese. | <i>m.</i> " S. spirito. |
| 48. Piazza " | <i>n.</i> Via di Ripetta. |
| 49. Teatro di Pompejo. | <i>o.</i> " del Corso. |
| 50. " Argentina. | <i>p.</i> " Babbuina. |
| 51. Piazza Cenci. | <i>q.</i> " della Fontanella. |
| 52. " Giudea. | <i>r.</i> " de' Condotti. |
| 53. Teatro di Marcello. | <i>s.</i> " Sistina. |
| 54. Rocca Tarpea. | <i>t.</i> " Felice. |
| 55. Campidoglio. | <i>u.</i> " delle quattro Fontane. |
| 56. Campo Vaccino. | <i>v.</i> " di Porta Pia. |
| 57. Cloaca Maxima. | <i>w.</i> " della Vita. |
| 58. Forum Boarium. | <i>x.</i> " delle Mercede. |
| 59. Ruins of the Palaces of the Cæsars. | <i>y.</i> " Tordinona. |
| 60. Reservoirs of the Baths of Titus. | <i>z.</i> " dell' Orso. |
| 61. Trofei di Mario. | <i>a'.</i> " di' Coronari. |
| 62. Mausoleo di Mario. | <i>b'.</i> " di' Banchi. |
| 63. Tempio di Minerva Medica. | <i>c'.</i> " di Monserrato. |
| 64. Anfiteatro Castrense. | <i>d'.</i> " Giulia. |
| 65. Basilica di S. Giovanni in Laterano. | <i>e'.</i> " del Fontanone. |
| 66. Ospedale. | <i>f'.</i> " del Pelegrino. |
| 67. Chiesa di S. Stefano Rotondo. | <i>g'.</i> " del Governo Vecchio. |
| 68. Piazza di S. Gregorio. | <i>h'.</i> " di' Giubbonari. |
| 69. Ponte Sublicio. | <i>i'.</i> " del Pianto. |
| 70. Ponte Rotto. | <i>k'.</i> " del Cesarini. |
| 71. Terme di Tito. | <i>l'.</i> " del Gesù. |
| 72. Coliseo. | <i>m'.</i> " di Arceli. |
| 73. Chiesa di S. Giovanni e Paolo. | <i>n'.</i> " Arco de' Pantani. |
| 74. Isola S. Bartolomeo. | <i>o'.</i> " Baccina. |
| 75. Ponte Sisto. | <i>p'.</i> " del Coliseo. |
| 76. " S. Angelo. | <i>q'.</i> " de' Serpenti. |
| <i>a.</i> Via della Lungara. | <i>r'.</i> " del Boschetto. |
| <i>b.</i> " della Lungaretta. | <i>s'.</i> " delle Carette. |
| <i>c.</i> " de' Genovesi. | <i>t'.</i> " di S. Lorenzo in Pane e perna. |
| <i>d.</i> " de' Morticelli. | <i>u'.</i> " Urbana. |
| <i>e.</i> " di S. Francesco. | <i>v'.</i> " Graziosa. |
| <i>f.</i> " di S. Michele. | <i>w'.</i> " di S. Pudenziana. |
| <i>g.</i> " delle Fratte. | <i>x'.</i> " di S. Maria Maggiore. |
| <i>h.</i> Borgo Vittoria. | <i>y'.</i> " Paolo. |
| | <i>z'.</i> " di S. Lucia in Selci. |
| | <i>a''.</i> " di S. Martino. |
| | <i>b''.</i> " di S. Vito. |
| | <i>c''.</i> " di Marmorata. |

11. MILAN (*Plate 41*).

Milan (in German, Mailand), the capital of the Lombardo-Venetian kingdom, although an ancient-looking, irregular city, still possesses some recently built palaces and churches, with many beautiful streets. The first rank amongst the public buildings is assumed by the celebrated Cathedral, 454 feet long, 275 broad, built entirely of white marble, and adorned, or rather overloaded, externally, with not less than 4000 statues; of the other seventy-eight churches, we may mention San Lorenzo, with antique marble columns, and Madonna presso San Celso; of the convents, the former Dominican Convent of Santa Maria delle Grazie, containing the renowned, but now almost entirely destroyed, fresco painting by Leonardo da Vinci, of the Last Supper; likewise the Palace della Corte, the Government Palace, the Palace of the Archbishop, the Mint, the Palace of the Court of Appeal, the Theatre della Scala, with 400 boxes, and capable of seating 7000 persons (in addition to which, Milan has six other theatres); the large hospital. The principal collections of art and science are: the Palace Brera, formerly belonging to the Jesuits, with a library, a gallery of antiques and paintings, a botanic garden, and an observatory; also, the celebrated Ambrosian Library, with 15,000 manuscripts, and a large cabinet of coins. There still remains to be mentioned the circus, built under Napoleon in the ancient style, and capable of seating 30,000 persons, with an arrangement for filling the arena with water: also the Marble Arch of Peace, commenced in 1807, by Napoleon, and completed in 1829; it is eighty-four feet high, forty-two broad, with eight marble columns forty-two feet high and two feet thick, and entirely covered with alto relievos. The most frequented promenade is the Corso. The place of a river is supplied by the Grand Naviglio Canal, commenced in 1271; it is nineteen miles long, and goes by the Abbiate Grosso into the Ticino.

EXPLANATION OF THE PLAN.

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| A. Piazza del Duomo. | 6. Tipografia Reale. |
| B. " dei Mercanti. | 7. Palazzo della Contabilità generale. |
| C. " del Palazzo Reale. | 8. S. Pietro Celestino. |
| D. " Fontana. | 9. San Damiano. |
| E. " della Vetra. | 10. San Pietro in Gessate. |
| F. " e Parochia di S. Eustorgio. | 11. Collegio Imp. delle Fanciulle. |
| G. Foppone, ossia Campo Santo. | 12. La Guastalla, Collegio. |
| H. Ponte di Porta Romana. | 13. Ospedale di S. Catterina. |
| 1. Piazza e Parrochia di S. Marco. | 14. Santa Maria del Paradiso. |
| 2. Collegio delle Vevede. | 15. San Calimero. |
| 3. Ospedale de' Fatebene-Fratelli. | 16. Orfanotrofio Milit. di S. Luca. |
| 4. Collegio de' Nobili. | 17. La Vittoria. |
| 5. San Bartolomeo. | 18. S. Calogero. |

19. S. Vittore al Carpo.
20. S. Nicolo.
21. Santa Maria del Castello.
22. Broletto Delegaz. Provinz. e Municipale.
23. Corte d' Apello ed Ipoteca.
24. S. Tomaso in Terra Mala.
25. Ufficio de' Tesi e Misure.
26. Il Carmine, Parrochia.
27. Palazzo dell' Imper. Reale Commt. Militare.
28. Palazzo di Brera, Accademia Reale.
29. Ponte Marcellino.
30. Posta de' Cavalli.
31. Monte de Pietà.
32. S. Giuseppe.
33. Amministrazione del Lotto.
34. Real Teatro della Scala.
35. Filodrammatici.
36. Direzione generale di Polizia.
37. Palazzo dei Marini e della Finanza.
38. Ufficio della Diligenza.
39. Monte.
40. Seminario.
41. Ponte di Porta Orientale.
42. " di San Damiano.
43. Piazza e Palazzo Belgiojoso.
44. Piazza e Parrochia S. Fedele.
45. Ufficio generale del Censo.
46. Teatro Rè.
47. Archivio pubblico.
48. Residenza de' Tribunali Civili.
49. Biblioteca Ambrosiana.
50. Ponte di Porta Toaa.
51. Luogo Pio Trivulzi.
52. Palazzo di Giustizia.
53. " Archivescovile.
54. " Reale.
55. Corte di Giustizia Correzionale.
56. Ospedale Maggiore.
57. Teatro della Conobbiana.
58. Ufficio della Posta per le Lettere.
59. S. Sepolcro e Piazza.
60. Direzione generale del Demanio.
61. S. M. Pedone e Piazza Borromea.
62. S. Giorgio.
63. S. Alessandro.
64. Teatro del Lentasio.
65. S. Eufemia e Piazza.
66. Ponte di S. Celso.
67. " delle Pioppette.
68. San Lorenzo.
69. Ponte di Porta Ticinese.
70. Ponte de' Fabbri.
71. Ospedale Milit. di S. Ambrogio.
72. Ponte di S. Vittore.
73. Caserma.
74. Ponte di Porta Vercellina.
75. Conservatorio di Musica e S. M. della Passione.
76. Palazzo del Governo.
77. S. Simpliciana e Caserma.
78. Collegio Calchi.
79. La Stella, Orfanotrofio.
80. Ospedale di S. Antonio.
81. Salesiane.
82. Teatro Carcano.
 - a. Stada di S. Teresa.
 - b. " di S. Angelo.
 - c. " Risara.
 - d. Borgo di S. Angelo.
 - e. Corso e Borgo di Porta Comasina.
 - f. Strada de' Fatebene-Fratelli.
 - g. Contrada di Borgo nuovo.
 - h. Contrada di Brera.
 - i. Strada del Pontaccio.
 - k. Contrada del Monte di Pietà.
 - l. " dell' Olmetto.
 - m. Corso di Porta nuova.
 - n. Corsia del Giardino.
 - o. Strada di S. P. Celestino.
 - p. " di S. P. Damiano.
 - q. Contrada di S. P. Romano.
 - r. " del Monte.
 - s. " di S. Paolo.
 - t. " del Marino.
 - u. Corsia de' Servi.
 - v. Contrada S. Margherita.
 - w. " delle Meraviglie.
 - x. Corso di Porta Vercellina.

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| <i>y.</i> Borgo delle Grazie. | <i>o'.</i> Contrada dell' Ospedale. |
| <i>z.</i> Stradone di S. Vittore. | <i>p'.</i> Contrada Larga. |
| <i>a'.</i> Strada del Ponte de' Fabbri. | <i>q'.</i> Corso di Porta Tosa. |
| <i>b'.</i> Strada della Vittoria. | <i>r'.</i> Contrada del Durino. |
| <i>c'.</i> Borgo di Viarenna. | <i>s'.</i> " della Lupa. |
| <i>d'.</i> Corso di Porta Ticinese. | <i>t'.</i> " di S. Orsola. |
| <i>e'.</i> Borgo di Cittadella. | <i>u'.</i> " di S. Simone. |
| <i>f'.</i> Strada del Molino delle Armi. | <i>v'.</i> " de' Ratti. |
| <i>g'.</i> Corso e Borgo di S. Celso. | <i>w'.</i> Corsia del Duomo. |
| <i>h'.</i> Strada di S. Sofia. | <i>x'.</i> Corso di S. Vittore 40 Martiri. |
| <i>i'.</i> Corso di Porta Romana. | <i>y'.</i> " di S. Andrea. |
| <i>k'.</i> Borgo di Porta Vigentina. | <i>z'.</i> " de' Bastelli. |
| <i>l'.</i> Strada dell' Ospedale. | <i>a''</i> " di S. Giuseppe. |
| <i>m'.</i> Contrada di S. Prassede. | <i>b''</i> " de' Filodrammatici. |
| <i>n'.</i> Strada del Foppone. | |

12. MADRID (*Plate 42*).

Madrid, the capital city of Spain, with a population of 200,000, lies in a bare unattractive plain on the left bank of the Manzanares, about 2000 feet above the level of the sea, and is built on a number of small hills. The river at the city is crossed by two large stone bridges, one of them 1130 paces long. The city forms an irregular quadrangle, surrounded by a high brick wall, and is divided into two northern and two southern quarters. The old quarter to the south-west has mean houses and narrow streets; the new, much larger and more beautiful buildings, and broad straight streets; amongst which may be mentioned those of Alcala, San-Bernardo, Fuen-carrel, and Toledo. The principal squares are the great market or Plaza Mayor, and the Plaza Puerto del Sol, the latter the centre of the city and the gathering place of the business people. Of the public buildings, we may mention the Castle Buen Retiro, or the ancient royal castle, on the east side of the city; the still unfinished new palace, 470 feet long, on the west side of the city; the large Ferdinando-Hospital, the City Hall, the Custom House, Post-Office, Arsenal, Mint, Court Prison, &c. Among the seventy-seven churches, conspicuous not on account of their architectural beauty, but for their excellent paintings, those deserving of especial notice are St. Isidore's Chapel, the Church of the Salesian nuns, the Church of St. Isabella, and the Church of Antiochia; of the convents, the Franciscan Monastery, inclosing ten courts. The collections of art and science are very important; among them the Royal Library of 200,000 volumes, with a cabinet of 150,000 coins and medals; the Library of San Isidoro, of 50,000 volumes; the Royal Museum, with one of the finest collections of paintings in existence; the Royal Cabinet of Natural History, and the Observatory on the new castle. The Prado is the most beautiful public promenade; it extends between the Palace Buen Retiro and the city, adorned with four rows of trees, as also with fountains and statues. There is likewise the

garden of Buen Retiro close to the Prado, with the statues of Philip II. and Charles I. A large aqueduct conducts springs of water from the Guadarama Mountain into the city, which is there distributed in thirty-two wells.

EXPLANATION OF THE PLAN.

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| 1. Palacio del Rey. | 36. Plaza de la Villa. |
| 2. Real Biblioteca. | 37. Casa del Duque de Infantado. |
| 3. Ministerios. | 38. San Audres, Parroquia. |
| 4. Casa que fue de suprema Inquisicion. | 39. Casa del Duque de Alba. |
| 5. Casa del Duque del Parque. | 40. Casa del Conde de Fernando Nuñez. |
| 6. Cuartel de Caballeria. | 41. San Francisco, Convento y Campillo. |
| 7. Casa del Duque de Osuña. | 42. Fabrica Real de Cristales. |
| 8. Cuartel de las Guardias de Corps. | 43. Orden Tercera, Hospital. |
| 9. Seminario de los Nobles. | 44. Matadero en la Puerta de Toledo. |
| 10. Colegio de las Arrepentidas. | 45. Carniceria del Rastro y Plaza Cerillo. |
| 11. Monserrate, Monasterio de Benitos. | 46. La Latina, Hospital. |
| 12. El Salvador. | 47. San Isidoro y Real Colegio. |
| 13. Santa Ana (Bernardos). | 48. Academia de la historia. |
| 14. El Rosario (Dominicos). | 49. Carcel de Corte. |
| 15. Casa del Duque de Albuquerque. | 50. Santo Tomas, Dominicanos. |
| 16. Hospital de los Franceses. | 51. Santa Cruz, Parroquia. |
| 17. Carmen Calzado, Convento. | 52. San Felipe Real, Augustinos. |
| 18. Cuartel de las Guardias Españolas. | 53. Casa de Correos. |
| 19. El Hospicio, Colegio. | 54. La Magdalena y Casa del C. de Salvatierra. |
| 20. Ninas de Leganes, Colegio. | 55. Trinitarios, Calza Convento. |
| 21. Aduana y Estanco general. | 56. Casa del Duque de Alba. |
| 22. Academia de las Nobles Artes. | 57. Fabrica de Aguardiente (Cigarros). |
| 23. Carmelitas Descalzos, Convento. | 58. Nuestra Señora de la Paz. |
| 24. Las Salesas, Monasterio. | 59. Plaza y Fuente de Lavapies. |
| 25. San Pasqual, Franciscas. | 60. San Lorenzo. |
| 26. Casa del Duque de Medina Sidonia. | 61. Carcel de la Corona. |
| 27. Hta. de San Felipe Neri. | 62. Anton Martin, Hospital. |
| 28. Gustinos Recoletos. | 63. Hospital de la Misericordia. |
| 29. Real Casa di Moneda. | 64. Beatas de San Josef. |
| 30. Posito. | 65. Loretto Ninas, Colegio. |
| 31. Espiritu Santo. | 66. Hospital grande para Hombres. |
| 32. Buen Suceso, Hospital. | 67. Agonizantes, Hospital. |
| 33. Descalzados Reales, Franciscas. | 68. Capuchinos del Prado, Convento. |
| 34. San Felipe Neri, Convento. | 69. Trinitarios Descalzos. |
| 35. Los Consjos. | |

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| 70. Gabinete de Historia Natural. | 78. La Leonera. |
| 71. Quartel de Caballeria. | 79. Plaza de los Toros. |
| 72. Plaza del Coliseo. | 80. Ermita de Nuestra Señora del |
| 73. Plaza principal y Casa de los | Puerto. |
| Proceres. | 81. Paseo de la Florida. |
| 74. Estudio y Jardin Botanico. | 82. Santa Maria de la Pabera. |
| 75. Observatorio. | 83. Nuestra Señora de Atocha. |
| 76. Campo Santo. | 84. Fabrica Real de Tapices. |
| 77. Estatua Equestre del Rey | |
| Felipe IV. | |

13. SARAGOSSA (*Plate 42*).

Saragossa, or Zaragoza, the capital of the Spanish province of Arragon, is situated in a fertile plain on the Ebro, over which stream is thrown a fine stone bridge, 600 feet in length. Below the city, the Huerba or Guerva empties into the Ebro, after having inclosed the south-eastern part of the city in a crescent. The population amounts to about 45,000. The streets, with but few exceptions, are narrow, crooked, and badly paved. One of the most prominent public buildings is the Church Nuestra Señora del Pilar, with an image of Mary on a column of jasper. The city is celebrated for its heroic defence under Palafox, against the besieging army of the French, from the 4th to the 14th of August, 1808, and a second time from December 20th, 1808, to Feb. 21, 1809, in which 60,000 persons perished by sword and famine. Under the Romans, this city was called Cæsar Augusta, or Cæsarea.

EXPLANATION OF THE PLAN.

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| 1. Convento de los Facetas. | 18. Calle del Mercado nuevo. |
| 2. Santa Lucia. | 19. San Juan de los Panales. |
| 3. San Domingo. | 20. Nuestra Señora del Pilar. |
| 4. Santa Inès. | 21. San Felipe. |
| 5. Capuchinos Descalzos. | 22. " Tomas. |
| 6. Nuestra Señora del Portillo. | 23. Convento de San Francisco. |
| 7. Quartel de Caballeria. | 24. San Diego. |
| 8. Circo para los Toros. | 25. Plaza del Carmen. |
| 9. La Misericordia. | 26. " y Convento de Santa |
| 10. Plaza de la Misericordia. | Engracia. |
| 11. Convento de los Capuchinos. | 27. Las Monjas de Jerusalem. |
| 12. Hospital. | 28. Hospital de los Locos. |
| 13. La Encarnacion. | 29. El Asco. |
| 14. Carmelettas Descalzos. | 30. El Sepulcro. |
| 15. Convento. | 31. Compañia de Jesus. |
| 16. " de la Vitoria. | 32. Universidad. |
| 17. San Pablo. | 33. San Augustin. |

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| 34. Santa Monica. | 38. El Calzas de San Josef. |
| 35. Plaza San Augustin. | 39. Castillo de Aljaferia (de la Inqui- |
| 36. Convento de San Josef. | sicion). |
| 37. " de San Lazaro. | |

14. BARCELONA (*Plate 42*).

Barcelona, the capital of the Spanish Principality of Catalonia, one of the largest and most flourishing cities in Spain, is situated on the Mediterranean Sea, between the mouths of the Llobregat and Bezas. With the neighboring town, or rather suburb Barceloneta, it has over 10,000 houses, and about 150,000 inhabitants, of which 10,000 belong to the above-mentioned suburb. On the east side of the city is situated a strong citadel, which is connected with the Fort of San Carlos on the sea; on the west side rises up Montjuý, with a fort which commands the harbor. Among the principal buildings are the great Cathedral, the ancient castle of the former Counts of Barcelona, a large hospital for 3000 invalids, the Arsenal, the Cannon Foundry, &c. There still remain, from the time of the Romans, the ruins of a Temple of Hercules, and of some baths. The spacious, but not sufficiently deep harbor, is protected by an extensive mole, at the end of which is a lighthouse.

EXPLANATION OF THE PLAN.

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| 1. Baluarte (Bastion) de la Porta Nueva. | 20. Baluarte del Principe. |
| 2. Baluarte de San Pedro. | 21. San Felipe. |
| 3. " de Jonqueras. | 22. " Fernando. |
| 4. " del Angel. | 23. Seminaritas, Colegio de Religiosos. |
| 5. " de los Estudios. | 24. La Misericordia. |
| 6. " de Tellers. | 25. Quartel de Cordelles. |
| 7. " de Valdoncella. | 26. Convento de las Capuchinas. |
| 8. " Nueva. | 27. Hospital de San Lazaro. |
| 9. " de San Antonio. | 28. Hospital general. |
| 10. " del Rey. | 29. Colegio de San Buenaventura. |
| 11. Quartel de Atarazanas. | 30. " del Carmen. |
| 12. Baluarte San Francisco de Asis. | 31. Casa de Comedias. |
| 13. San Ramon. | 32. Administracion de Correos. |
| 14. Baluarte de Mediodia. | 33. Fundicion de Artilleria. |
| 15. " de la Reyna. | 34. Estanco Real del Tabaco. |
| 16. Casa del Gobernador. | 35. Barracas del Vino y Azeite. |
| 17. Iglesia (Church). | 36. Aduana. |
| 18. Quartels (Barracks). | 37. Palacio del General. |
| 19. Baluarte del Rey de la Ciudadella. | 38. La Lonja. |
| | 39. Hospital de Santa Maria. |
| | 40. Inquisicion. |

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| 41. La Catedral. | 46. Quartel de Infanteria de Barceloneta. |
| 42. Academia Militar. | 47. Plaza Mayor. |
| 43. Nuestra Señora de Junqueras. | 48. San Miguel. |
| 44. Quartel de los Estudios. | 49. Quartel de Caballeria. |
| 45. Parroqua de San Pedro. | 50. Plaza San Miguel. |

15. COPENHAGEN (*Plate 43*).

Copenhagen, or Kiöbenhavn, the capital city of the Danish monarchy, is situated on the island of Zealand, on the Sound, and in part on the small island Amak; it has a population of about 125,000 souls, among them 2400 Jews. It consists of Copenhagen proper, again divided into the Old Town and New, or Frederick Town (the two separated by the Goth's street, 4200 feet long), Christianshaven on the island of Amak, and the citadel Frederikshaven. Frederiksstad is the most beautiful and regular part of the city, rendering Copenhagen one of the finest towns in Europe. The principal squares are the Frederiks Plads, with the statue of Frederick V., and King's New Market, with the statue of Christian V. The most conspicuous buildings are the royal residence Amalienburg, with two other castles, that of Rosenborg (with a cabinet of coins and a fine garden), and the new Christiansborg (containing a beautiful chapel, a large library, and a museum of art consisting of paintings and antiques); adjoining the palace is the Thorwaldsen Museum, containing all the works of the great sculptor, and valuable collections of paintings, coins, medals, gems, &c., bequeathed by him to his native city; the Church of Our Lady, with statues by Thorwaldsen, representing Christ and the Apostles; the Church of the Trinity, with a tower 111 feet high, access to which, even for wagons, can be had by a flat spiral ascent; the Frederik or Marble Church (ruin of an unfinished edifice); the Church of the Redeemer, with a high spire, the top of which is reached by an *external* spiral staircase; the great Frederik's Hospital, &c. Among the scientific collections are: the Royal Library, of 500,000 volumes, and the rich collections illustrative of northern antiquity, in Christianburg Castle, where they fill six rooms. Copenhagen is remarkable for its exquisite naval and commercial harbors.

EXPLANATION OF THE PLAN.

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| <i>Squares (Pladser, Torve).</i> | D. Rosenborg's Have. |
| A. Kongens Nytorv (King's Market), with the statue of Christian V., the Royal Theatre, the Royal Academy of Arts, &c. | E. Excerer Plads. |
| B. Frederiks Plads, with the Amalienburg, and the equestrian statue of Frederick V. | F. Slots Pladsen (Castle Square). |
| C. Marmor Pladsen. | G. Gammelholm. |
| | H. St. Annä Plads. |
| | I. Dronningens Enghave. |
| | K. Tömmer Pladsen. |
| | L. Vilders Plads. |
| | M. Hambros Plads. |
| | N. Høibro Plads. |

Buildings.

1. Christiansborg Slot, with the Museum, the Court Theatre, the Court Chapel, Library, &c.
2. Prindsen's Palais.
3. Söbatterie.
4. Proviant Gaard.
5. Exchange and Bank.
6. University Direction.
7. Holmenskirke (Archives).
8. Barracks.
9. Frederiks Hospital.
10. Clasens Library.
11. Land Cadet Academi.
12. Chirurgisk Academi.
13. General Staff Bureau.
14. Palace.
15. Museum of Art.
16. Garnisonskirke.
17. Sö-Cadet Academi.
18. House of the West India Company.
19. Bommen (gate of harbor).
20. Garnisons Hospital.
21. Deaf and Dumb Asylum.

22. Rosenborg Slot.
23. Royal Porcelain Factory and Orphan Asylum.
24. Petrikirke.
25. Fruekirke.
26. Gammel Torv, and Ny Torv.
27. Halm Torv.
- 28*a*. Lange Bro (Bridge).
- 28*b*. Knippels Bro.
29. Holms Pladsen and Laboratory.
30. Porcelain Manufactory.
31. Artesian Well.

Streets.

- a*. Gammel Strand.
- b*. Gothers Gade (street).
- c*. Nyhavn, Byens and Charlottenborg Side.
- d*. Botanisk Have.
- e*. Amalie Gade.
- f*. Æster “
- g*. Adel “
- h*. Borger “
- i*. Store-Kongens “
- k*. Norges “

16. STOCKHOLM (*Plate 43*).

Stockholm, the capital of the kingdom of Sweden, has a highly picturesque situation, partly on islands, partly on the mainland at the outlet of Lake Mälar. The city contains a population amounting to 90,000, and is divided into six parts; the city proper, on three islands, Helgeand, Stads-, and Riddarholm. Norrmalm, with Blasiholm, united to the city proper by a handsome granite bridge; Södermalm, the southern suburb; Skips- and Castellholm to the north-east; Ladugorsland, with Djurgorden, in the east, and Kongesholm. The central part of the city has many beautiful buildings, fine squares and regular streets, while the outside consists of miserable hovels. Among the principal buildings are: the Castle on the island of Stockholm, built in 1698–1701, with a large garden; the Hoved- and Ritterholm Churches, the latter with the tombs of the kings (since Charles X.), with those of many eminent men, together with 5000 standards captured in battle; the Adolph Frederick's Church; the Opera House, Arsenal, City Hall, and the Nobles' House; the immense Iron Warehouse; the Store House; the Palace of the Stattholder; the Bank, Mint, Observatory, &c. Among the monuments

are: the bronze statue of Gustavus III., in front of the Castle Square, on the coast; the statue of Gustavus Vasa and Gustavus Adolphus; and the statue of Charles XIII. on the Parade Square.

EXPLANATION OF THE PLAN.

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| A. Royal Castle and Castle Square. | <i>f.</i> Ronde Gatan. |
| B. Riddarhus Torget (Nobles' House Market). | <i>g.</i> Stads Trägords Gatan. |
| C. Karl XIII. Torget. | <i>h.</i> Tjärhofs Tvargatan. |
| D. Artillery Square and Barracks. | <i>i.</i> St. Paul's Gatan. |
| E. Ladugords Lands Torget. | <i>k.</i> Horn's " |
| F. Humle gorden. | <i>l.</i> Besvärs " |
| G. Helgeandsholmen. | <i>m.</i> Timmerman's or Makleres Gatan. |
| H. Adolf Frederick's Torget. | <i>n.</i> Tanto Gatan. |
| I. Ny Torget. | <i>o.</i> Horns Tulls " |
| 1. Johanniskyrka (Church). | <i>p.</i> Öster Lang " |
| 2. Adolf Fredric's kyrka. | <i>q.</i> Stora Ny " |
| 3. Observatory. | <i>r.</i> Nya Nörr Bro. |
| 4. Eleanora Church. | <i>s.</i> Regerings Gatan. |
| 5. St. Clara " | <i>t.</i> Drottning " |
| 6. Kungsholm " | <i>u.</i> Kungs " |
| 7. Lazaretto. | <i>v.</i> Nore Tulls " |
| 8. Nya kungsholm Bro. | <i>w.</i> Grobergs. " |
| 9. Island Stromsborg. | <i>x.</i> Gomla Kungsholm Bro. |
| 10. St. Maria's Church. | <i>x.</i> Munklagers Gatan. |
| 11. St. Katherine's Church. | <i>y.</i> Stora Kungsholms " |
| 12. Black Torget. | <i>z.</i> Handverkare " |
| 13. Gustavus Adolphus' Monument. | <i>a'.</i> St. Sur Bruns " |
| | <i>b'.</i> Kammakare " |
| | <i>c'.</i> Södra Hummelgårds " |
| | <i>d'.</i> Stor " |
| | <i>e'.</i> Nya Quarters " |
| | <i>f'.</i> Skippare " |
| <i>a.</i> Stora Göthe Gatan. | <i>g'.</i> Nörrlands " |
| <i>b.</i> Tullports " | <i>h'.</i> Ny Bron " |
| <i>c.</i> Södermanlands " | <i>i'.</i> Nybro " |
| <i>d.</i> Tjörhols " | <i>k'.</i> Sevedbats " |
| <i>e.</i> Falkenberg's " | |

17. ANTWERP (*Plate 43*).

Antwerp, capital of the Belgian province of the same name, the most prominent city in Belgium, with a population of 80,000, is situated on the right bank of the River Scheldt, which is here very broad and navigable for large ships. It is regularly built, and has many beautiful edifices.

Amongst them : the Cathedral, the largest and finest Church of the Netherlands, 500 feet long, 240 broad, with 125 pillars, five naves, and the highest spire in the world (444 feet), it is distinguished also for containing the monument to Rubens and his two great masterpieces, the Descent from the Cross and the Ascent ; also, the new Theatre, the old Hanseatic House, &c. Other objects deserving of attention, are the capacious Wharves and Arsenals, the two great basins of hewn stone, thirty feet deep, connected with the Scheldt by sluices, and capable of containing thirty-four and fourteen ships of the line, respectively. Among the other sights, is a fine gallery of paintings (Museum), especially rich in works of Rubens and Vandyk. A monument to the first-named artist, in the shape of his statue by Geefs, has recently been erected. The city is strongly fortified ; on the southern point of the city is situated the renowned Citadel, built since 1567.

EXPLANATION OF THE PLAN.

Gates (Portes).

- I. Porte de Malines.
- II. " de Borgerhout.
- III. " Rouge.
- IV. " de Slycke.
- V. " de l'Escaut.

Squares.

- A. Place S. Valburge.
- B. Grande Place.
- C. Place de la Monnaie.
- D. " du Marché de Vendredi.
- E. " Verte.
- F. Marché au bétail.
- G. " aux veaux.
- H. Place des Facons.
- I. " de Meir.
- K. Le Gage.
- L. Marché aux grains.
- M. Place du Canal Sal.
- N. Jardin Botanique.
- O. Marché aux Bœufs.
- P. Place Krauwel.
- Q. " des Accises.
- R. " Nassau.
- S. " de Hesse.
- T. Marché aux Cochons.

Streets.

- 1. Rue du Couvent.
- 2. Quai Plantin.
- 3. Rue haute.
- 4. " Pierre Pot.
- 5. Quai Vandyk.
- 6. " Jordaens.
- 7. " Taverniers.
- 8. " St. Laureys.
- 9. " Timmermans.
- 10. " Godefridus.
- 11. " Ste. Aldegonde.
- 12. Rue des Brasseurs.
- 13. Canal des Facons.
- 14. " d'Amidon.
- 15. Marché aux Chevaux.
- 16. Rue Klapdorp.
- 17. Marché au Lait.
- 18. Rue des Sœurs Noires.
- 19. Vieux Marché aux Cordes.
- 20. Rue des Peignes.
- 21. " Large.
- 22. " des Beguines.
- 23. Ruelle du Livre.
- 24. Rue des Chevaliers.
- 25. " de l'hôpital.
- 26. " du Rosier.
- 27. " Champ des Flamands.
- 28. " du Vieux Coq.

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| 29. Rue de la Digue d'Ever. | 50. Rue des Aveugles. |
| 30. " Rempt du Lombard. | 51. " des Princes. |
| 31. Les trois Coins. | 52. " d'Hoboken. |
| 32. Rue des Tanneurs. | 53. " Rouge. |
| 33. " Pré de l'hôpital. | 54. " de la Boutique. |
| 34. " d'Arenberg. | 55. Verke Straet. |
| 35. " de la Santé. | 56. Rue de Venus. |
| 36. Longue rue du Mai. | 57. Canal des Recolets. |
| 37. Rue des Arbalétriers. | 58. Marché aux Bœufs. |
| 38. " des Agneaux. | 59. Rue des Prédicateurs. |
| 39. " de la Houblonnière. | 60. " de la Cuiller. |
| 40. " de Jesus. | 61. " V. Roch. |
| 41. " de Arquebusiers. | 62. " de Mannageurs. |
| 42. " Sale. | a. Théâtre des Variétés. |
| 43. " du Chêne. | b. Hôpital Civil. |
| 44. Courte Rue neuve. | c. Ancien Arsenal. |
| 45. Longue Rue neuve. | d. Comédie. |
| 46. Rue Kipdorp. | e. } Maison de Rubens. |
| 47. Marché V. Jacques. | f. } |
| 48. Rue St. Anne. | g. Poste aux lettres. |
| 49. " de l'Empereur. | |

18. AMSTERDAM (*Plate 43*).

Amsterdam, the capital of the kingdom of the Netherlands, and especially of the province of North Holland, and one of the most important places of trade in Europe, is situated on the Amstel and the Bay of Y ; it is divided by numerous canals (graghten) into ninety islands, which are united again by 290 bridges. In 1840, its population amounted to 211,000, and now to at least 225,000, amongst which are 46,000 Catholics, 35,000 Lutherans, 24,000 Jews (20,000 Germans and 4,000 Portuguese), 2000 Anabaptists, &c. On account of the marshy soil, most of the houses (which amount to the number of 27,000, with thirty-nine churches) are built on piles. Among the canals, which impart so peculiar an appearance to this city, as well as to all others in Holland, are the Heeren-, Keizers-, and Prinsengraght, with the Cingel, all of which are planted with trees, and encircle the city in parallel curves, and distinguished for their breadth (the Keizergraght is 140 feet wide), their length, and for the beauty of the buildings on their banks. The most important and largest buildings are: the former City Hall, built in 1648-1655, but now the royal palace, resting on 13,659 piles, beautifully ornamented throughout the interior: it is 282 feet long, 235 broad, 116 high, with a spire 327 feet in elevation; near it, and likewise on the Dam, is the new church, built on 6000 piles, with numerous monuments of eminent men, especially of De Ruyter and Vondel; the Reformed Male and Female Hospital, 360 feet long, 230 feet broad, and adapted for more than 600 persons; the Trippen House, with a good collection of

paintings, &c. Among the peculiar constructions are the numerous wharves, docks, sail and rope factories, &c., all in the vicinity of the harbor on the Y. Finally, the Botanic Garden and the Menagerie Gardens of the Society "Natura Artis Magistra," are well worthy of being seen.

EXPLANATION OF THE PLAN.

| <i>Squares.</i> | |
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| A. De Noorder Markt. | 21. 2 ^{de} Dwars Straat. |
| B. Heere Markt. | 22. Noordsee Bosch. |
| C. De Wester Halen Mkt. | 23. Noorder Straat. |
| D. Den Dam. | 24. Nieuwe Loyer " |
| E. Anthonis Markt. | 25. " " Slood. |
| F. Boter Markt. | 26. Utrechtsche Dwars Str. |
| G. Weesper Plein. | 27. Weesper Straat. |
| H. Stads hout Werf. | 28. Utrechtsche " |
| I. Varcken Markt. | 29. Yssel " |
| K. Osen Markt. | 30. Spiegel " |
| L. Leydsche Plein. | 31. Leydsche " |
| M. Haarl Plein. | 32. Kalver " |
| | 33. Doelen " |
| | 34. Nieuwen Dyk. |
| | 35. Zee Dyk. |
| | 36. S. Anton Bree Straat. |
| <i>Streets.</i> | |
| 1. Bidders Straat. | 37. Hoog " |
| 2. Bidders Eyland. | 38. Regul. Bree " |
| 3. Hout Tuynen. | 39. Regul. Dwars " |
| 4. Haarlemer Dyk. | 40. Amstel " |
| 5. Vinke Straat. | 41. Swanenburger " |
| 6. Palm. | 42. Vloyenburger " |
| 7. Goudbloem Straat. | 43. Joden Bree " |
| 8. Linden. | 44. Hout Tuynen " |
| 9. Boom. | 45. Rapenburger " |
| 10. Angeliers. | 46. Valkenburger " |
| 11. Tuyn. | 47. Uyenburger " |
| 12. Eglantiers. | 48. Batavier " |
| 13. Nieuwe Lely Straat. | 49. Binnen Kant. |
| 14. Blom Straat. | 50. Wael Eyland. |
| 15. Laurier " | 51. Katten Burgh. |
| 16. Elands " | 52. Witten Straat. |
| 17. Korte Leydsche Dwars Straat. | 53. Oosten. |
| 18. Lange " " " | 54. Kerk. |
| 19. Kerk Straat. | 55. Wittenburger Straat. |
| 20. 1 ^{de} Dwars " | 56. Kl. Kattenburger " |
| | 57. Gr. " " |
| | 58. Koninglyke Werf. |

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| 59. Haring Packerye. | v. De Noorder Kerk. |
| a. Zoulkeetens Graght (canal). | w. De Wester “ |
| b. Reaalen Graght. | x. Nieuwe “ |
| c. Brouwers “ | y. Paleis. |
| d. Leyn Baens “ | z. De Beurs (Exchange). |
| e. Prinsen “ | a'. Oude Kerk. |
| f. Keizers “ | b'. Anthonis Waegh. |
| g. Heeren “ | c'. Gasthuys (Hospital). |
| h. Cingel. | d'. Reguliers Waegh. |
| i. Nieuwe Zydts. | e'. Reguliers Tooren. |
| k. Spuy. | f'. Caserne Oranje Nassau. |
| l. Kloveniers Burg Wal. | g'. Koul Magazyn. |
| m. Geldersche Kaay. | h'. Ryks “ |
| n. Waals Eylands Graght. | i'. De Stadts “ |
| o. Rapenburg Wal. | k'. Amstel Schul Sluys. |
| p. Uylenburg Wal. | I. Haart Poort (Hafen). |
| q. Marckens Graght. | II. Leydsche Poort. |
| r. Hout Kopers Burg-Wal. | III. Utrechtsche “ |
| s. De Muyder Graght. | IV. Weesper “ |
| t. Achter “ | V. Muiden “ |
| u. Reguliers “ | |

19. LEGHORN (*Plate 44*).

Leghorn, or Livorno, in the Grand Duchy of Tuscany, is situated in a low country on the Mediterranean Sea, and a canal connecting the city with the Arno. With its excellent and double harbor (Darsena) and large Mole, it is one of the most important places in Italy for the pursuits of navigation and commerce. The population amounts to 80,000 souls, including 5000 Jews, who possess two thirds of the town; there are also Greeks, Armenians, and Turks. The north part of the city, termed New Venice, and intersected extensively by canals, is very regularly built. The finest street is the Strada Ferdinanda; the rest are straight and well paved, but rather narrow and obscure. Among the buildings of note are: the Grand Ducal Castle; the Synagogue; the Turkish Mosque; the colossal marble statue of Ferdinand I., in front of the harbor; the Arsenal; the Quarantine establishment, with three Lazarettoes, and especially the Magazine for goods coming from lands infested with the plague; the large hospitals; a lighthouse in the sea, with 214 steps; an aqueduct of nine miles; an enormous cistern. The Leopold Railroad connects Leghorn with Florence.

EXPLANATION OF THE PLAN.

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| A. Piazza dei Grani. | C. Piazza S. Marco. |
| B. Piazzetta la Crocetta. | D. “ de' Grani. |

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| E. Piazza della Posta. | 17. Porta Colonetta. |
| F. " dell' Erba. | 18. " Nuova. |
| G. " Rangoni. | 19. " San Marco. |
| H. " dei Condotti. | 20. " a Pisa. |
| I. " d'Armi. | a. Via dei Capuccini. |
| J. " della Darsena | b. " del Lazzaretto S. Rocco. |
| K. " S. Benedetto. | c. " del Ponte de' Lami. |
| L. Cimitero Vecchio. | d. " dello Spalto S. Cosimo. |
| M. " Inglese. | e. I Condotti Nuovi. |
| 1. Cattedrale. | f. Via Disperata. |
| 2. Palazzo Reale. | g. Borgo Reale. |
| 3. Cancelleria Comunale. | h. Via delle quattro Cantonate. |
| 4. I Tre Palazzi. | i. " Reale. |
| 5. Real Dogana. | k. " Serristori. |
| 6. Palazzo del Governo. | l. " S. Francesco. |
| 7. Magazzino del Sale. | m. " S. Giulia. |
| 8. Arsenale. | n. " del Monte. |
| 9. Casone. | o. " Grande. |
| 10. Fortino. | p. " del Giardino. |
| 11. Parlatori. | q. " dell' Annunziata. |
| 12. Teltoia del Fanale. | r. " di S. Giovanni. |
| 13. " Nuova. | s. " del Porticciolo. |
| 14. " della Cuoia. | t. " Borra. |
| 15. Porta Murata. | u. " S. Marco. |
| 16. " Capuccini. | v. " del Corso. |

20. FLORENCE (*Plate 44*).

Florence (Firenze), surnamed "the beautiful," the charming capital of Tuscany, with a population of 105,000, is situated in a fertile plain on the Arno, surrounded by mountains. It is protected by two citadels, and possesses streets which are mostly narrow, although clean (excellently paved in mosaic work, with plates of basalt), amongst which the finest are the Via Larga and the Corso. There are 160 public monuments, 10 fountains, 170 churches and chapels, 89 monasteries and nunneries, 8 theatres, and 17 large squares. The finest of the last are the Grand Duke's Square, with the column of Cosmo I., and a marble group (Rape of the Sabine women), by John of Bologna; the square Santa Maria, with two obelisks, and the square dell' Annunziata, with two fountains, and the statue of Ferdinand I. The finest churches and chapels are: the Cathedral, Santa Maria del Fiore, 500 feet long, covered externally with squares of black and white marble, chess-board fashion, and with an octagonal dome 380 feet high, and a separate tower of 280 feet; the church St. Maria Novella, with many painted windows, and other pictures; Santa Croce, with the tombs and monuments of Galileo, Macchiavelli, Alfieri, and Michael Angelo; the chapel of St. Lawrence Church, adorned with jasper, lapis lazuli, and other

precious stones, and with monuments of the Grand Duke ; the baptizing chapel, il Battisterio, in which all children born in Florence are baptized, with the metal folding doors by Ghiberti ; the church and convent of the Holy Ghost ; the Church del Carmine, with a finely painted dome, &c. The royal residence, called Palace Pitti, to which belongs the garden Boboli, is over 500 feet long, and contains the finest works of art, in eight saloons and several hundred rooms ; the same may also be said of the contiguous Palazzo Vecchio, the former residence of the Grand Duke, with its fine Loggia or Hall. More celebrated and better worth seeing than either, is the gallery termed Palazzo degli Uffici, which is directly opposite, and whose third story contains, in twenty-three saloons and apartments, the rarest master-pieces of art, paintings, engravings, statuary, gems, mosaics, bronzes, and coins, all combined. Another large collection is that of the Academy of Arts ; and the palaces of the old Florentine families, Riccardi, Strozzi, Gerini, and Corsini, and others, are likewise rich in gems of art. Among the scientific collections may be mentioned : the Medicean Library in the Convent of St. Lorenzo, with 120,000 volumes ; the Grand Ducal and Magliabecchian Library ; the Marucelli Library ; the Museum of Natural Sciences, and the Botanic Garden. At the head of the scientific and literary institutions stands the University, founded in 1438, although for the Italian language the Accademia della Crusca is far more renowned ; chief among the charitable institutions is the great St. Mary's Hospital, capable of accommodating seven hundred sick persons.

EXPLANATION OF THE PLAN.

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| A. Piazza S. Marco. | 11. Teatro della Pergola. |
| B. " Vecchia. | 12. Chiesa S. Maria Maddalena de' |
| C. " S. Maria Novella. | Pazzi. |
| D. " del Gran Duca. | 13. Chiesa S. Ambrogio. |
| E. " S. Croce. | 14. Teatro Alfieri. |
| F. " del Carmine. | 15. Chiesa S. Croce. |
| G. " S. Spirito. | 16. Galleria Medici. |
| H. " dei Pitti. | 17. Palazzo Vecchio. |
| 1. Chiesa S. Maria Novella. | 18. " Pitti. |
| 2. " S. S. Trinità. | 19. Museo di Storia Naturale. |
| 3. " S. Lorenzo. | 20. Teatro Goldoni. |
| 4. Teatro del Cocomero. | 21. Chiesa S. Spirito. |
| 5. Duomo S. Maria del fiore. | 22. " il Carmine. |
| 6. Chiesa S. Marco. | a. Via Chiara Boffi. |
| 7. Accademia di Belle Arti. | b. " de' Serragli. |
| 8. Chiesa S. Annunziata. | c. " S. Agostino. |
| 9. Teatro degli Intrepidi o Torro | d. " Maggio. |
| Nuovo. | e. " della Nunziatina. |
| 10. Ospedale de S. Maria Nuovo. | f. " del Campuccio. |

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| <i>g.</i> Via dell' Orto. | <i>b'.</i> Via S. Bastiano. |
| <i>h.</i> Borgo S. Frediano. | <i>c'.</i> " Borgo di Pinti. |
| <i>i.</i> " S. Jacopo. | <i>d'.</i> " Pietrapiana. |
| <i>k.</i> Lungo l'Arno. | <i>e'.</i> Borgo la Croce. |
| <i>l.</i> Via de' Bardi. | <i>f'.</i> Via dell' Agnola. |
| <i>m.</i> Palazzuolo. | <i>g'.</i> " delle Fornaci. |
| <i>n.</i> Borgo Ognissanti. | <i>h'.</i> " Ghibellina. |
| <i>o.</i> Pantano di Ripoli. | <i>i'.</i> " dei Malcontenti. |
| <i>p.</i> Via della Scala. | <i>k'.</i> Corso. |
| <i>q.</i> Valfonda. | <i>l'.</i> Borgo degli Albizzi. |
| <i>r.</i> Via Faenza. | <i>m'.</i> Via delle Torri. |
| <i>s.</i> " Vangelista. | <i>n'.</i> P. S. Maria Mercato Calmara. |
| <i>t.</i> " dei Ciliegio. | <i>o'.</i> Via del Giglio. |
| <i>u.</i> " degli Alfani. | <i>p'.</i> Via de' Ginori. |
| <i>v.</i> " dei Pilastri. | <i>a.</i> Ponte di ferro. |
| <i>w.</i> " S. Zanobi. | <i>b.</i> " alla Caraja. |
| <i>x.</i> " del Campo Accio. | <i>c.</i> " S. Trinitade. |
| <i>y.</i> " S. Gallo. | <i>d.</i> " Vecchio. |
| <i>z.</i> " Larga. | <i>e.</i> " alle Grazie. |
| <i>a'.</i> " del Cocomero Maglio. | |

21. ANCONA (*Plate 44*).

Ancona, the most important harbor and place of trade in the Papal States, and capital of the delegation of the same name, is situated on the Adriatic Sea, between two hills, one of which carries the citadel, and the other the cathedral. Its present population is 24,000 (or 32,000, according to other estimates), amongst which are 5000 Jews. The streets, with few exceptions, are narrow and crooked. The finest building is the Exchange; other objects of interest are the great Quarantine Building; the great Triumphal Arch, of white marble, erected in honor of the Emperor Trajan, and of Pope Benedict XIV., the one as builder, the other as restorer of the Mole; the remains of a Roman Amphitheatre, and the Mole on the harbor, 2000 feet long.

EXPLANATION OF THE PLAN.

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| A. Piazza S. Bartolomeo. | H. Piazza S. Maria. |
| B. " del Commune. | I. " S. Primiano. |
| C. " S. Francesco. | 1. Duomo Cattedrale. |
| D. " Grande. | 2. S. Domenico Convento. |
| E. " del Teatro. | 3. SS. Annunziata. |
| F. " Nuova. | 4. S. Francesco ad Alto Convento. |
| G. " Sotto Fortezza. | 5. La SS. Concezione. |

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|----------------------------|-------------------------------|
| 6. S. Agostino Convento. | II. Porta Calamo. |
| 7. SS. Sacramento. | III. " Capo di Monte. |
| 8. Francesco del Ospedale. | a. Strada nuova del Duomo. |
| 9. Il Gesù Seminario. | b. Via Grande. |
| 10. San Palazia. | c. Strada Nembrini. |
| 11. San Pellegrino. | d. " delle Scuole. |
| 12. Palazzo Apostolico. | e. " Calamo. |
| 13. " del Commune. | f. " dell' Annunziata. |
| 14. Teatro nuovo Casino. | g. " S. Pietro. |
| 15. Loggia de' Mercanti. | h. " della Loggia. |
| 16. Arsenale. | i. " del Porto. |
| I. Porta Farina. | k. " grande di Capo di Monte. |

22. MODENA (*Plate 44*).

Modena, the capital of the Italian Duchy of Modena, with a population of 28,000, is situated on a canal connecting the Secchio with the Panaro. It is well built, and most of the streets have covered ways or arcades on the side. The beautiful castle is well arranged internally, and contains an excellent collection of paintings and antiques, although the former picture gallery was sold to Dresden in 1746. The town has thirty-four churches and three convents. Among the scientific institutions are: a University, a Library, an Academy for nobles, a Society of Sciences, &c. The former citadel now serves as a house of correction. The city itself is very ancient. In the time of the Romans it was called Mutina.

EXPLANATION OF THE PLAN.

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| 1. Palazzo Ducale. | 13. Dogana. |
| 2. Ministerio di Buon Governo e Polizia, Accademia delle Belle Arti, &c. | 14. Tribunali di Giustizia. |
| 3. Ministerio delle Finanze. | 15. Congregazione di S. Filippo Neri. |
| 4. Scuderie Ducali, Ufficio Tipo- grafico. | 16. Intendenza delle Opere pie. |
| 5. Palazzo Comunale. | 17. Educandato di S. Paolo. |
| 6. Duomo e Vescovado. | 18. Teatro Comunale. |
| 7. Seminario Vescoville. | 19. Tipografia Camerale. |
| 8. Università. | 20. Chiesa del Voto. |
| 9. Convitto Medico. | 21. Madonna del Popolo. |
| 10. " Legale. | 22. S. Giovanni decollato. |
| 11. " Matematico. | 23. P. Domenico. |
| 12. Collegio dei Gesuiti. | 24. Terziarie di S. Domenico. |
| | 25. Paradiso. |
| | 26. Salesiane. |
| | 27. S. Bartolomeo. |

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|--------------------------|-------------------------------|
| 28. San Salvatore. | 35. San Pietro. |
| 29. San Paolo. | 36. Santa Trinità. |
| 30. San Carlo. | 37. Corpus Domini. |
| 31. Santa Maria Pomposa. | 38. San Vincenzo. |
| 32. S. Sebastiano. | 39. San Francesco. |
| 33. Crocefisso. | 40. Chiesa Tedesca. |
| 34. San Barnaba. | 41. Terziare di S. Francesco. |

HISTORY AND ETHNOLOGY.

81 PLATES : III. 1—39, AND IV. 1—42.

GENERAL INTRODUCTION TO HISTORY.

HISTORY, in general, is a credible narration of remarkable events, occurring within the sphere of man. *Historiology*, or historic lore, is the personal apprehension or knowledge of these events ; or, more comprehensively, it is a clear perception of the authentic and distinguished transactions of humanity, in their proper connexions and dependences.

Nothing but positive, actual occurrences may constitute the *contents* or material of history. Their *form* is narration ; and history can claim for itself a just and reliable basis, only as it relates what is absolutely truthful. Hence two elements must enter into all genuine history : veritable *facts* as a foundation, and unyielding *fidelity* in their communication. *Historical verity* depends upon the correctness of the evidence supporting the facts, for we cannot become cognisant of past occurrences by intuition, much less by personal observation ('Αντοψία), and we dare not manufacture them to suit our purpose ; *historical fidelity* rests upon the honest presentation of the facts. It must be obvious, therefore, that a writer of history ought to possess the highest intellectual and moral qualifications, and if either of these be wanting, his production will be defective. *Pragmatic* history exhibits clearly the causes and consequences of events. The practical results arising from a general review of the facts, and especially of the nature and efficient cause of events, make up the *philosophy of history*. By *historical inquiry* or investigation is meant the collection of materials for the work. *Method* (Historiomathy) *arranges* these in accordance with some ascertained plan ; and the *writing of history* (Historiography) means, of course, giving form and style to the materials.

The sources of very ancient history are fables, legends, traditions, myths, and popular songs ; grottoes, sepulchres, altars, pillars, mounds, monuments, &c. ; festivals, games, and public structures erected in commemoration of some event. Of later history the materials are more abundant. In addition to public buildings, monuments, pillars, and graves, we consult inscriptions, triumphal arches, coins, medals, genealogical tables, the science of heraldry, public archives, diplomatic papers and correspondence, codes of law, annals, memoirs, chronicles, journals, magazines, and newspapers.

History presents great variety in its subject matter, and in this view it is

divided into numerous departments. Thus we have Universal, Particular, and Special (Monographic) history; and these again, according to the subject under discussion, take the names of Church history, Political, or Literary history. When the writer wishes to collect and arrange the transactions in their proper order of succession, his work is called *Chronology*; and *Synchronical history* ranks the leading events of all countries in parallel positions, in the order of their dates. To this class belong "Historic Charts," "Streams of Time," &c. It is also divided into *Synthetic* and *Analytic*. On the synthetic method are constructed such histories as dispose in chronological order all events relating to a common topic; on the analytic, all the events are narrated together which have reference to any object of importance. So far as the transactions of a nation may illustrate its social condition, government, and constitution, their treatment is called *political history*; and when the discussion involves an investigation of the character, development, and genius of a people, it is called the *history of civilization*. In practice, however, this distinction seldom appears, as both are usually combined in the same work. From this whole subject, it will be seen that history derives important aid from Geography, Chronology, and Statistics.

On the score of time, history is usually divided into Ancient, Middle, Modern, and Recent, and each of these again into several periods.

Ancient history has two subdivisions: the Classic and the non-Classic Ages, an arrangement which we have adopted both in the letter-press and the plates.

I. HISTORY OF THE ANCIENT WORLD.

RUDE OR NON-CLASSIC AGES.

A. FROM ADAM TO CYRUS (UNTIL 560 B.C.).

Over the origin of the world, no less than that of man himself, there rests an impenetrable veil. Nevertheless, every nation in its primeval days formed various views about it, which were rendered in different versions by the philosophers, priests, and poets of a later day. Thus appear the myths and legends describing the creation of the world and of man; and although these are strongly colored by the peculiarities of national character, yet they bear more or less resemblance to one another, and are our only light to the almost rayless past.

The Jewish chronicles, which Christians implicitly follow, represent Adam and Eve as the common ancestors of the human race. Their first children were Cain and Abel. Cain, actuated by envy, murdered Abel, and fled westward, where he somehow established a colony, and became the father of a busy race of craftsmen and artificers. Thus Jabal was the father of such as dwell in tents and raise cattle (nomades); Jubal was the inventor of music; Tubalcain was the first artificer in brass and iron; Lamech was

the founder of the art of poetry ; and Naamah introduced the useful arts of spinning and knitting. Society soon became divided into castes, the stronger confirming themselves in power, and placing their weaker brethren in servitude.

After the flight of Cain, Eve bore another son, Seth. The exiled murderer, unfortunately, had not carried with him all depravity, for the corruption of morals was commensurate with the increase of population. To arrest the progress of vice, the deluge came, and, with the exception of Noah, the descendant of Seth, and his family (eight persons in all) swept man and beast from the face of the earth. Traditions concerning this flood are found in many nations, and they generally agree with each other.

After the subsidence of the waters, the family so signally preserved, turned their earliest attention to the business of husbandry and the rearing of flocks, specimens of which, together with every species of living nature, Noah had taken with him into the ark. Ham, a son of Noah, having offended the paternal dignity, fell under his father's curse, which consigned him and his children to bondage under his brothers. This caused inequality of condition, and the patriarchal form of government grew weak and inefficient.

Noah's other posterity, proceeding eastward, settled in the country of Mesopotamia, between the rivers Euphrates and Tigris. At first they led a nomadic life ; but wishing to attain a more stable position, the whole people assembled in the plains of Babylonia, and commenced the erection of a tower, whose lofty dome was to pierce the clouds, and form the rallying point for the scattered laborers and warriors, when affairs of general interest were to be discussed. But according to the legend of the Old Testament, the Deity, beholding in this movement a bold and rebellious spirit, confounded the language of the laborers, and thereby dispersed the multitude. The various parties, united now in accordance with their leading interests, abandoned the place, and founded colonies in different parts of the globe. Thus separate tribes present themselves before us as early as 2000 B.C. Thenceforth their legends grow more authentic, and make a respectable approach towards history. We now proceed to treat of them in order.

1. THE EGYPTIANS AND ETHIOPIANS.

The opinion has long prevailed that the old Egyptians sprang from the African Negro stock. It has been proved, however, that the inhabitants of Africa have belonged to three different races in all history. The Negro stock predominates in the interior or west, the Caffrarian occupies the south, and the Moors, who in their form, physiognomy, and hair, resemble the handsomely-shaped nations of Europe and Western Asia, and indeed differ only in possessing a dark color, settled in the north and west. Beyond question, the ancient Egyptians were descended from the Moors, as must be obvious by the numerous monuments in which the country abounds. The mummies, as well as the inhabitants represented on these huge structures, point to the

same fact. The figure of the bodies and the color of the skin demonstrate the identity of origin. (*Plate 3, figs. 1-4*, various Egyptian faces and head-dresses; *figs. 5^a and ^b*, heads of male mummies; *figs. 6^a and ^b*, female heads; *fig. 7*, a mummy.)

Rich as Egypt is in monuments of antiquity, they contribute but slightly to her early history. What subsequently became the powerful kingdom of Egypt, was once a group of small states, each of which had its king. Of these, Thebes and Memphis were by far the most powerful. Abraham, who, during a famine in Palestine (2000 B.C.), wandered into Lower Egypt, found there a powerful and flourishing kingdom. Joseph entered Middle Egypt, 1800 B.C., and later induced his father and brothers to emigrate thither and settle in the land of Goshen. Two hundred years afterwards, their descendants, the Israelites, were forced to leave Egypt for Palestine.

The most celebrated of the early kings was Sesostris, 1500 B.C. He consolidated the whole of Egypt into one government, subdued the eastern districts of the country to the Red Sea and Ethiopia, and by gifts of money and land, secured the affections of his subjects. With an army of nearly a million men, he then conquered the Ethiopians and Troglodytes, crossed the Ganges, and is said to have overrun nearly the whole of Northern Asia, contended with the Scythians, and entered Europe from the East. Upon his return home, he directed his attention to the improvement of the country; and with his rich spoils and skilful artists from other lands, whom he brought home as prisoners, he constructed those immense works of utility and ornament, for which Egypt is so celebrated.

The immediate successors of Sesostris have left but little to rescue their names from oblivion. Cheops and his brother Chephren, and also Mycerinus the son of Cheops, have indeed handed down some vestiges of their power and wealth, in the shape of the pyramids. But they enjoy an unenviable immortality, as the erection of these massive piles was marked by tyranny, poverty, and suffering. It opened the way for dissensions at home, and invited upon a weak and oppressed people, the invasion of foreign nations. At last twelve leading princes, 666 B.C., formed a confederacy for the restoration of peace and union, and erected the Labyrinth as a sign of their own unanimity. (*Pl. 3, fig. 36*, entrance to the Labyrinth.) But the compact was of short duration. One of the princes, Psammeticus, uniting with a band of Greek mercenaries and pirates, expelled his allies and restored the monarchy. His son, Necho (610 B.C.), attempted to connect by a canal the Nile and the Arabian Gulf. He conquered the whole country between Egypt and the Euphrates; but lost the battle with Nebuchadonazar at Circesium, 606 B.C., and thus Egypt became subject to the Babylonian empire.

Passing over the unimportant reigns of Psammis and Apries, we come next to Amasis (536 B.C.). Under this able prince, Egypt recovered much of her splendor, industry found suitable encouragements, and a brisk commerce was carried on with Greece and the islands of the Archipelago. But about a month after his decease, Cambyes, king of Persia, marched against the new monarch, Psammenitus, besieged Pelusium, which surren-

dered with scarcely the show of resistance, reduced the country to bondage, and placed the priests especially under the severest yoke. Egypt now remained a Persian province, until it was conquered by Alexander the Great, 331 B.C. After his death (321 B.C.), it became the inheritance of one of his generals, Ptolemy, who again elevated it to the dignity of an independent kingdom. In this form it maintained its ascendancy until the battle of Actium, 31 B.C., when it changed masters again and became a Roman province.

Internal Condition of Egypt.

Under the reign of Sesostris, the country was divided into thirty-six provinces, administered by functionaries of different grades, according to a written code of laws. The population ranged between five and seven millions, and was divided into several castes. The principal of these were the *Sacerdotal Caste*, who occupied all the valuable public offices, and patronized the arts and sciences; the *Warrior's Caste* watched over the external defence and internal tranquillity, constituted a complete war establishment, and was the rank from which the king was usually elected. Then followed in rank, respectively, the *Agriculturists*, the *Herdsmen*, the *Tradesmen* (artists, mechanics, retailers, and merchants of every sort), the *Interpreters*, who conducted the negotiations between the Egyptians and foreigners; and finally, the *Boatmen of the Nile*. Each caste lived separately, and the offspring could not rise above the rank in which they were born.

The education of the priesthood was mostly practical. It was directed to an intimate knowledge of the soil, climate, and productions of the country, and to the sciences bearing upon these subjects: Astronomy, Mathematics (especially Geometry), Architecture, Painting, Music, Botany, Medicine, and Chemistry. They knew the art of writing, and had exclusive possession of the art of recording transactions, discoveries, &c., in symbolical pictures and figures (hieroglyphics) standing for words and ideas, decipherable only by themselves.

The religion and its various ceremonies, of the Egyptians, are in a measure represented on our plates. In addition to the stars, they worshipped the crocodile, the falcon, the ichneumon, the ibis, dog, cat, wolf, and above all the ox (apis). Astronomy has placed the figures of animals among the constellations, and as animal worship was doubtless the result of star worship, so the psychological ideas of the Egyptians had a close relation to the same subject. Thus they assigned to the souls of the dead a journey of three thousand years over the zodiac, when they again would return to animate human bodies. This explains, also, the great care bestowed upon the preservation of the bodies by embalming. It was a powerful effort to protect against the corroding touch of time, the human tabernacle, and have it in readiness when the spirit should have accomplished its pilgrimage.

The process of embalming was conducted by a large class of persons, and formed a considerable business. The flesh was first well pressed, so as

to discharge the free juices, the brain was extracted through the nose, and the body enveloped in bandages. *Pl. 3, fig. 7*, exhibits a mummy with the inner folds. Over these were wrapped other pieces, to the number of fifteen or twenty. The head was covered with a square sheet of linen cloth, which spread over the face and formed a species of mask. Sometimes five or six of these pieces were laid upon the face, the outer fold being painted or gilded, and representing, with some approach towards accuracy, the countenance of the deceased. The legs were fastened together, and the arms crossed on the breast, by fillets saturated with rosin; and after the entire person had been fully bandaged, with much art and symmetry, the bands were adorned with hieroglyphics (*fig. 8*). These fillets were, however, usually surrounded by an envelope of peculiar construction. It consisted of linen, folded many times, and stiffened by glue or paste. This was again inclosed in a coffin made of sycamore or cedar, which resembled the mummy in form and size, and consisted of two pieces fastened to each other by pegs or cords, and coated with plaster or varnish. The outside was then ornamented, and marked with hieroglyphics (*fig. 9*). Remains of these mummies, inclosed in wooden chests or coffins, are but rarely found at the present day. *Figs. 10, 11* represent mummies in coffins; *fig. 12*, side view of the coffin, with the lid.

Besides human corpses, the Egyptians frequently embalmed their sacred animals, especially the *Apis*, if it died a natural death, and the *Ibis* nearly always. They inclosed the body in linen or woollen bandages, over which were fitted fine thread nets (*fig. 13*). A kind of embalming was followed also with smaller animals, mammalia, amphibia, &c. (*fig. 14*).

The mummies were deposited in cellars hewn in the rocks. Many of these sepulchres have been discovered, and are known under the name *catacombs*. Upon the limestone walls, numerous representations—some in sculpture, and others in painting—are found, indicating the domestic, civil, and religious condition of the people. The pyramids (*pl. 1, fig. 1*), of which a fuller description will be given under the head of Architecture, were also used as depositories for the dead; whilst those lofty pointed columns known as obelisks (*pl. 1, figs. 34, 35*), were only erected as monuments to illustrious departed.

It was considered the greatest disgrace not to be buried with solemnity. But lest the honor of a solemn sepulture should be bestowed upon the *wicked*, the dead were tried before a court (*pl. 1, fig. 1*) consisting of forty judges, whose office it was to determine whether the deceased had merited embalming and a solemn funeral, or not.

In the neighborhood of a group of pyramids at Ghizze, not far from Cairo, stands a gigantic sphinx, hewn from a single rock. It is 143 feet in length, and 62 feet in height. Only twenty-seven feet of it now project from the ground, the remainder being concealed by the sand. The sphinx originally presented the body of a lion, with a human head (*pl. 1, fig. 1*; *pl. 3, fig. 32*; *pl. 6, fig. 1*); sometimes the figure of a lion covered with a veil (*pl. 3, fig. 33*). At the temple of Karnak, sphinxes have been found, with rams' heads, lions' bodies, and human hair reaching over the back and breast

(*pl. 6, fig. 2*). The sphinx symbolized power and wisdom as the attributes of Deity; therefore the temples contain a great number of these emblems.

The sculpture and painting of the catacombs already referred to, introduce us to the life and pursuits of the Egyptians, and acquaint us especially with their employments, science of warfare, musical instruments, and the furniture and implements of their houses and farms. Thus *pl. 2, fig. 1*, represents an Egyptian king in a short cloak, or in his war dress with a striped tunic over it; another is drawn in a carriage by two splendidly caparisoned horses led by warriors, while other attendants shade him with parasols. Other pictures represent kings in battle, or the customs observed at their birth or during their education, the offerings and presents made to them (*fig. 10*); and the solemnities connected with their death. Those pictures also embrace vivid representations of the priests and people, and their common pursuits. Agriculture, commerce, and trade, were the occupation of the people, *i.e.* of all but the caste of the priests. The priests' dress consisted of a short linen tunic, with short sleeves, and fastened above the hips by a girdle (*pl. 2, fig. 2*). They wore shoes of papyrus or leather. The head was seldom covered, and the hair was curled or braided. Sometimes a linen cloak was thrown over the shoulders, but always laid off before entering a temple. The women (*pl. 2, fig. 3*) wore a full dress over the tunic. It was either of linen or cotton, with wide sleeves, and of various figures and colors, though white was preferred. They wore their hair carefully arranged, and adorned their heads, ears, and hands, with ribbons, buckles, and rings, in rich profusion. Their feet were neatly, though lightly covered.

The furniture of the various rooms was costly and magnificent. Precious metals and the choicest wood from foreign countries were wrought up into articles exhibiting much taste. These, together with silks and cloths of oriental texture, increased the comforts and charms of the dwellings. The beds, richly hung with tapestry, were in the form of lions, jackalls, bulls, and sphinxes; and the ottomans, divans, couches, chests, coffers, drinking vessels, &c., were of the most finished workmanship. The folding chairs had commonly feet representing necks of swans, the heads downwards; candelabra and lamps, vessels of every size, vases of gold, gilded metal, silver, and other expensive materials; all these in luxuriant abundance, of costly form, and studded with enamel and precious stones, were the usual appendages in every well regulated Egyptian dwelling. In the palaces of the nobles and kings, of course, these ornaments reached an astonishing degree of magnificence.

For a representation of these articles, we refer to *pl. 3, figs. 15 and 16*, urns; *figs. 17-19*, large stone vases; *fig. 20^a and ^b*, pitchers; *figs. 21 and 22*, altars; *figs. 23 and 24*, common chairs; *fig. 25*, folding chair; *figs. 26 and 27*, arm chairs; *figs. 28 and 29*, divan and foot stool; *fig. 30*, a knife; and *fig. 31*, a royal sceptre. *Pl. 6, figs. 3-6*, altars; *fig. 7*, a table; *figs. 8-14^{ab}*, various pitchers, goblets, and vases; *figs. 15-19*, bowls and drinking vessels; *fig. 20*, a bowl; *fig. 21*, a ladle; *fig. 22^a*, a necklace; and *fig. 22^b*, a war sceptre.

Hunting and fishing served among the Egyptians as pleasant diversions (*pl.* 1, *figs.* 6, 7 AB), though sometimes they became employments; and the plate now referred to delineates the various animals of the chase, and also the peculiar styles of fishing, as the hook, line, net, and trident; and *fig.* 7 B presents the preparing of the fish for the table. *Fig.* 5 represents some operations common in agriculture. The wine culture, and everything pertaining to it, is seen in *fig.* 8, A-D. *Figs.* 2-4 show the manipulations of other trades, and particularly *fig.* 2, workers in leather; *fig.* 3, cabinet-makers; and *fig.* 4, butchers.

2. THE HEBREWS OR JEWS.

We shall refer at large to these people under the head of Religious Rites. For the present we merely call attention to a view of Absalom's grave in the Valley of Josaphat (*pl.* 6, *fig.* 54).

3. ASSYRIANS, BABYLONIANS, AND MEDES.

As before observed, the districts around the Euphrates and Tigris were peopled at a very early period. Of their first settlement, nothing is absolutely known; the Assyrians, Babylonians, and Medes, present themselves as the most powerful and ancient races in that division. Having scarcely any written accounts, we must form an idea of their civilization and luxury from the representations copied from their old monuments. *Pl.* 2, *figs.* 7, 8, magnificent costume of distinguished Assyrians; *figs.* 15 and 16, the simpler dress of the Medes; *figs.* 10 and 11, Assyrian warriors on foot; *figs.* 12, 13, Assyrian horsemen; *fig.* 9, Assyrian slaves. The head-dress was very various and splendid, as already observed. *Pl.* 6, *fig.* 32, gives an Assyrian tiara; *fig.* 38, a helmet; and *fig.* 40 ^{ab}, plain Assyrian head-dresses.

4. PERSIANS, SYRIANS, AND PHRYGIANS.

The province Persia, in the south bordering on the Persian Gulf, and in the north on Media, was doubtless the nucleus of the great Persian monarchy.

The Persians, like the Egyptians, buried their dead with great solemnity, in rock vaults. *Pl.* 3, *fig.* 40, and *pl.* 6, *fig.* 51, represent the vaults found in the neighborhood of Persepolis. The Persian apparel strongly resembled that of the Medes (*pl.* 2, *figs.* 17-20), though the women wore a peculiar head-dress (*pl.* 4, *fig.* 3). For the head-dress of the Persian kings, see *pl.* 6, *figs.* 30, 31. A laced shoe (*fig.* 46) covered the foot. For a fly-brush they used a bunch of horse hair, fastened to a carved handle (*fig.* 47). The Persian trumpet (*fig.* 48) was straight; and their dishes and vessels sometimes plain (*fig.* 50), at other times costly (*fig.* 49). *Pl.* 4, *fig.* 13, represents a Syrian; and *pl.* 6, *fig.* 52, the so called rock-grave of Midas.

The ancient Phrygians adopted a simple style of clothing (*pl.* 4, *fig.* 8)

They covered their heads either with the capes of their full wide-sleeved cloaks, or with a peculiar cap (*pl. 6, fig. 39*). At their public solemnities, as festivals, sacrifices, &c., they wore a dress with tight sleeves, and over this another, which was embroidered and had no sleeves. Ribbons and wreaths adorned their heads; and they usually wore boots, laced in front. The upper part of the leg was left bare (*pl. 7, fig. 14*).

5. CELTS, SCYTHIANS, AND SARMATIANS.

According to the Greek historians, the Celts lived in Western Europe. The Romans called them Gauls, and under this name particularly, they have rendered themselves illustrious for energy and power.

It is highly probable that they occupied the districts around the Caspian Sea, whence they emigrated about the time of the elder Tarquin, overrunning the South and West of Europe. *Pl. 6, fig. 28*, a Sarmatian head-dress; *fig. 29*, the tiara of a Scythian king.

6. INDIANS AND CHINESE.

By many writers the Indians are regarded as the most ancient people extant, because about them we have the earliest records of their state of civilization; but their annals are involved in the usual obscurity which marks all chronicles of remote antiquity. Modern East India is the scene of their pursuits; and much information may be gathered from their architecture, temples, monuments, and sepulchres.

We give (*pl. 3, fig. 37*) a ground plan of an Indian pyramid, used as a tomb; *fig. 38*, elevation of the same; and *fig. 39*, a section. Other interesting monuments of ancient Indian architecture will be represented on the plates illustrating Architecture.

The dress of the Indians, mostly made of silk and cotton, was not remarkably gaudy. The head coverings were melon-shaped, as *pl. 6, fig. 33*, female head-dress, and *figs. 34, 36*, male head-dresses; or cylindrical (*fig. 37*); or simply a hood (*fig. 35*) extending down below the neck. Their fans were made of peacocks' and pheasants' feathers (*fig. 43*); also, the fly brushes (*figs. 44, 45*). They did not display much skill in their ornaments, if we may judge from a necklace (*fig. 41*), or from a belt (*fig. 45^b*).

Of China we shall treat more at large hereafter. We here only describe the emperor's dress (*pl. 6, fig. 42*). He wore a pearl in his cap (the cap buttons are used even in modern times, to mark the rank of the Chinese), and a yellow silk under-dress, on which was stamped the five-clawed dragon, which none but the emperor might wear. The warriors differ but slightly in dress from the other classes (*pl. 2, fig. 5*). Their armor consisted of the short sword, and the bow and arrow, and they wore a species of helmet or leather cap, as a defence to the head and face.

7. ETHIOPIANS.

We have already spoken of this tribe, when treating of the Egyptians. They are alluded to in the earliest known legends, and they seem to have spread over a vast extent of territory. In the progress of time, however, the name was applied separately to the nations living in modern Nubia, Abyssinia, Adel, &c., as far as Cape Prasum (Dulgado).

Of all these states, Meroë was the most distinguished for industry, civilization, and refinement. In no ancient country, perhaps, were religion and its ceremonies more respected. See (*pl. 6, figs. 23, 24*) the head-dress of Ethiopian monarchs.

A large peninsula, formed by the rivers Astaboras (Laccazze) in the west, and Astaphus (Bahr el Abiad), properly an arm of the Nile, in the east, composes the modern kingdom of Senaar in Nubia, and the northern portion of Abyssinia. This was the ancient Meroë, where, at an early date, the priests formed a very powerful caste.

West of Meroë was the land of the Nubians, beyond these the Sembritians, while the Macrobian occupied the south along the coast of the Indian Ocean. The Troglodytes, a race of traders and cattle breeders, lived on the coast of the Red Sea, from the limits of Egypt to Cape Dire. During the rainy season they retired to large caves in the rocks.

Ancient Numidia answered to modern Algiers. It contained several important cities, among which we name Cirta, the capital. *Pl. 6, fig. 25*, represents the head-dress of a Numidian king.

Mauritania lay westward from Numidia, from which it was separated by the River Ampsaga. It constituted the north-western portion of Africa, and had a valuable and extensive coast on the Mediterranean. Its inhabitants, the Moors, were unequalled in horsemanship, and the use of the bow and lance, like their modern descendants. *Pl. 4, fig. 2*, shows the apparel of an ancient Mauritanian.

The Carthaginians, a North-African nation, sprang from a colony of Phœnicians. The city was founded by Dido, queen of Tyre. As we shall return to the Carthaginians when speaking of Rome, we close this notice by a reference to (*pl. 6, figs. 55–57*) Carthaginian coins, exhibiting also the common head-dress of the citizens; and *pl. 4, fig. 1*, the costume of a Carthaginian king.

8. ARABIANS AND ARMENIANS.

Legend generally attributes the origin of the Arabians to Ishmael, the son of Abraham and his bond-woman Hagar. The Arabians designate as the father of their race, Kahton or Joctan, the ancestor of Abraham. The northern provinces can never have been occupied by any powerful state, as will appear from Moses' expeditions, and the easy conquest of the country by David and Solomon. Yet the whole peninsula was never completely subjugated by any foreign conquerors. The vast deserts, the free and

daring spirit of the nomadic tribes, have guarded the soil. *Pl. 4, fig. 7*, an Arabian warrior.

Ancient Armenia comprehended not only the districts and the sources of the Rivers Euphrates, Tigris, Kyros, and of the Araxes to its junction with the Kyros, but extended to the Caspian and Black Seas, and reached far into Asia Minor. With its neighbor Assyria, it succumbed first to the Median sway, afterwards to Persia, and never again recovered its independence. Commerce was the favorite pursuit of this people. *Pl. 4, fig. 4*, Armenians, man and boy; *figs. 5, 6*, Armenian warriors.

B. FROM CYRUS TO AUGUSTUS (560-530 B.C.).

1. THE PARTHIANS.

Parthia was a small province lying to the south-east of the Caspian. Originally it formed a part of Hyrcania, a province of the Persian empire. Under Arsaces it rose to the rank of a kingdom. His successors, the Arsacidæ, resided in Hecatompylos. Like Thessaly in Greece, Parthia was celebrated for its excellent horses. The Parthians were distinguished for their admirable riding, and the use of the bow. They led a wild, roving life. *Pl. 4, fig. 14*, a Parthian.

2. THE CELTS AND SCYTHIANS.

We have previously said that a portion of the Celts or Gauls overran Western Europe. Another branch invaded Italy, and settled along the shores of the Adriatic, while another horde peopled Gallia and a large portion of Spain. Some even penetrated north, and crossed into Britain. Thus the great Celtic root comprehended several important stocks, which branched out in various directions, experienced singular vicissitudes, and by frequent grafting, lost much of their original character. We now introduce the following tribes.

a. The Getæ. This tribe, descendants of the Scythians, inhabited that part of Thrace lying between Mount Hæmus and the River Ister (Danube). They were a brave and hardy race, and vigorously contested every inch of ground with the Romans; but were at last compelled to surrender to the emperor Trajan, who joined their country to Dacia.

b. The Dacians. These also lived between Hæmus and the Danube, and were distinguished equally with the Getæ for courage. They possessed a strong and almost unconquerable nationality, and had peculiar customs; but they too yielded before the all-subduing might of the Romans under Trajan. *Pl. 4, figs. 9, 10*, Dacian warriors; *figs. 11, 12*, Dacian women. *Pl. 6, fig. 27*, common head-dress of the Dacians.

c. The Celtiberians (*pl. 4, fig. 15*) were a mixed tribe of native Iberians and roving Celts, who lived in the districts washed by the Iberus (Ebro) and the upper part of the Durius (Duero) in Spain.

d. The *Iberians* (Spaniards) (*fig. 6*, an Iberian woman) were a tribe living originally near the Straits of Gibraltar, but who afterwards overspread a large portion of the peninsula.

e. The *Gauls* possessed nearly all modern France, North Italy, part of the Tyrol, Carniola, and some districts of Central Italy. They were of Celtic extraction, and, prior to the invasion of the Romans, totally rude and uncivilized. They conducted their religious ceremonies in the dense forest, whose strong oaks served as temples; their sacrifices were accompanied by the gloomy songs of the bards, who also during battle sang, at the head of the combatants, their wild strains of victory and war. *Pl. 5, fig. 4*, Gauls from the district of Narbonne, and a bard; *fig. 5*, a Druid and a warrior of Gallia Belgica; *fig. 6*, a native of Gallia Celtica, near Marseilles; and *figs. 7, 8*, a common and a noble Gaul in the time of the Roman supremacy.

f. *Britain* was first discovered by the Phœnicians, who carried on a commerce in tin with the natives. The first inhabitants had come from the continent, and gradually overspread the whole island; but at a later period were repulsed and dislodged by the Belgæ, who, landing on the east, compelled their adversaries to confine themselves to the north and west. When the Romans invaded the island, they took them for aborigines, and named them Britons. Penetrating to the north, they were driven back by the furious Picts and Scots, whose descendants to this day inhabit the Scottish Highlands, the Hebrides, and a considerable portion of Ireland. *Pl. 4, fig. 17*, a female impersonating Britannia.

3. THE GERMANS.

If Tacitus may be credited, the Germans have always dwelt in the country bearing their name. They were genuine aborigines.

They worshipped the earth-descended *Tuisco* (Teut) and his son *Mannus* as their prime ancestors. From the sons of Mannus sprang three leading tribes: the *Inagævones* near the North Sea, the *Istævones* on the Rhine, and the *Hermiones* in the interior and south. To these Pliny adds other powerful tribes: the *Vindili* near the Baltic, and the *Peucini* in Hungary. Some writers lean to the opinion that the Celts had dwelt in the country before the Germans, who entered it from the south-east. At a very early period, we see not only the names of tribes here mentioned, but many others of less importance.

The first grand historical movement of the Germans occurred about 114 B.C. They now appear restless and discordant, harassing and plundering each other; and one body, dissatisfied with their location, emigrating southwards to the Danube, invaded the Roman lines, and scattered death and ruin in their track. They conquered the Romans lying at Noreia in Styria, 113 B.C., but instead of pressing into Italy, they crossed the Rhine and entered the Gallic territories. These hordes bore the name of Teutons and Cimbri.

The subjugation of Gallia was easy and rapid. The Teutons were still carrying on sanguinary battles with the Belgæ, while the Cimbri,

abandoning Gallia, penetrated as far as Marseilles, where they encountered and completely routed a Roman legion, 109 B.C. This successful battle was followed by several others, and in the year 105 B.C., on the banks of the Rhone, they overwhelmed the whole of the Roman forces. Again they failed to profit by their good fortune. Instead of a direct invasion of Italy, they marched to Spain to subdue the Celtiberians; but when they returned, 102 B.C., without accomplishing their object, and now commenced the invasion of Italy, they found the Romans well prepared to meet them, and so unfortunate were their repeated contests for the Teutons, that their forces were almost annihilated.

The Cimbri followed their brethren in an effort to subjugate Rome (101 B.C.), but met with small success, and finally relinquished the plan. Their defeat terminated the war, and a quiet of several years' duration succeeded. Civil war, however, still prevailed in Germany for some time, until at length the tribes on the Upper Elbe, Vistula, and Danube, formed the confederation known as the *Suevian Union*, whose power seemed invincible. A branch of it, the Marcomanni, from the district between the Danube and the Neckar, under Ariovistus, 72 B.C., went to the aid of the Sequani and Arverni against the *Ædui*, both Gallian tribes. Their aid decided the conflict in favor of the Sequani, who were now compelled to give up a third part of the country to their allies, who settled there, and drew after them more Germans, neither Romans nor Gauls daring to interfere. But when they became too troublesome, the helpless Gauls invoked against their oppressors the aid of Julius Cæsar, who, when Ariovistus had refused to negotiate, attacked him at Besançon, 58 B.C., and completely routed the Germans; Ariovistus escaped with a few adherents across the Rhine. Cæsar won a similar battle against the German tribes, the *Usipiti* and *Tenchtheri*, who had crossed the Rhine. He gave up his idea of penetrating further into the country when he learned that the whole *Suevian Union* were arming themselves against him. Meantime Rome had won many battles in other lands, and had succeeded in gaining the friendship of some German tribes; several tribes, especially the Ubii, even fought with their forces. When the Roman republic was changed into a monarchy, and the idea of a universal dominion had taken deep root in the Romans, they resolved to subjugate the whole of Germany. In the pursuit of this ruling idea, the Roman army soon distinguished itself along the banks of the Danube, subdued Noricum, Rhætia, and Vindelicia, and reduced them to Roman provinces, 15 B.C.

We break here the thread of German history, purposing to resume it at a subsequent period. A brief glance at their character and manners may not be uninteresting.

The ancient Germans were a gigantic race, with fair hair, blue eyes, a clear white skin, and a piercing and haughty glance. From their early youth they were trained to the endurance of hardships, in their rough climate, which rendered them indifferent to suffering and fatigue. They possessed an astonishing power of endurance. Immediately after birth, infants were plunged into cold water, in the presence of the family and of

warriors (*pl. 5, fig. 2*). The children went naked, and were bathed in cold water by their mothers; men, women, boys, and girls, constantly invigorated themselves by bathing in the rivers.

The prevailing characteristics were patriotism, truth, chastity, courage, hospitality, and love of order and discipline. Marriage with them was a sacred institution, and virtue and modesty were, above all things, expected of every bride. The youth who loved a maiden offered her his hand for lawful alliance, and the parents blessed the union. The parties then exchanged presents; the bride offered the bridegroom various pieces of armor, and he in turn presented her with oxen and cows, a bridled horse, shield, lance, and sword. *Pl. 5, fig. 3*, ceremony of a German wedding.

In time of peace the Germans abandoned themselves to idleness or play; sometimes they indulged in the excitement of the chase. The free Germans disdained agricultural labor; they left the care of husbandry to menials, and the domestic concerns to the women. They lived chiefly on the flesh of wild and domestic animals, fruits, milk, &c. They made beer from barley, mead of wild honey and water, and only on the Rhine was wine drunk. They wore no ornaments except their arms. Arrayed in these they even appeared at their banquets, of which all were very fond, and which frequently degenerated into revels.

Their dress, like their dwellings, was simple and unadorned. The men wore a mantle manufactured from bast or the skin of wild beasts. The women dressed in a garment gaudily colored, without sleeves, and fastened by a girdle. Their long, beautiful hair flowed loosely over their shoulders.

Architectural taste seems to have been little known among the Germans. They generally lived in huts, constructed of rude logs and mud, and covered with thatch; not a few would seek shelter merely in caves, especially in winter. *Pl. 5, fig. 1*, a German family in their dwelling.

Four great classes marked their social arrangements. 1. The superior, wealthy aristocracy. These held great property, controlled the legislation, and furnished the leaders in battle. 2. The common freemen, enjoying less respect and influence than the former, and limited as to their property in goods and slaves. Though of inferior position, they constituted a powerful body. 3. The tenants (*Cientes, Lassi*), who received from the proprietors of the soil a small tract for cultivation, and paid for it in corn, cattle, and cloth. 4. *Slaves*. These were bought and sold at pleasure, and labored only for the profit of their owners, who possessed over them the power of life and death. On the whole, however, the German slaves were not so cruelly treated as those of the Greeks and Romans.

The superiors formed commonwealths, several of which were grouped in a district, several districts making a county, which was ruled by a count. In time of war several united counties elected a duke. Only a few tribes were governed by kings. The German warriors usually fought on foot, horsemen only being found where horses were bred. *Pl. 4, fig. 18*, a German war leader (duke); *fig. 19*, a warrior.

Religious ideas consisted mainly in the worship of nature. However,

the Germans also adored godlike characters, as Thor, Wodan, and Freia. They revered no visible objects, and erected no temples. Their sacred places were groves and woods, where they built their altars and offered their sacrifices. Their system included priests and priestesses, and ecclesiastical authority often extended beyond any jurisdiction which the civil magistrate would dare to assume. The priest could scourge a citizen in the name of the Deity; he generally opened the legislative assembly, commanded silence, and held the banner of the tribe in battle. The priestess confined herself within the sphere of prophecy.

The dead were burnt upon a funeral pile, amid the shrieks and lamentations of their surviving relatives. If the deceased was a young man, his arms and horse were consumed with him. After the fire had gone out, the ashes and the bones of the body were carefully collected, and buried beneath a light sod. They believed in the immortality of the soul, and therefore would meet death without fear or terror.

Their ideas of heaven (Valhalla) were rather sensual. It was peopled only with German heroes, who continued their warlike pursuits, intermingled with banquets and revels.

THE CLASSIC AGES.

1. THE GREEKS (Ἕλληνες, *Hellenes*) FROM THEIR SETTLEMENT TO THE PERIOD OF THE ROMAN SUPREMACY.

Historians unite in the opinion that the greater part of ancient Greece was colonized by the Pelasgians. They were even considered as the aborigines of several provinces, as of Arcadia. It is, however, more likely that the Arcadians came from Asia.

Greece presents four grand natural divisions: Hellas, Macedonia, Epirus and Thessaly, and the Peloponnesus.

The southern division, Peloponnesus, contained the districts of Arcadia, Achaia, Argolis, Laconia or Sparta, Elea, and Messenia. In Hellas, or Greece Proper, were Attica (Athens), Bœotia, Phocis, and Ætolia.

The Greeks are generally represented as rude and uncultivated, yet from the accounts which have reached us of their ancient architecture, religious ceremonies, and discoveries, we infer a degree of civilization among them, even in the most ancient times. Probably not more than five generations had lived in Thessaly, when Deucalion arrived there. A general deluge had driven him and his men from the deserts of Parnassus. His followers named themselves Hellenes, after his son Hellenes. Spreading themselves over Greece, and mingling with the Pelasgi, their name became by degrees predominant throughout the country. At a later period, the Æolians, Dorians, Ionians, and Achæans stand out prominently in history; some Greek historians mention new accessions of emigrants from Asia and Egypt, in 1580 and 1350 B.C. These various elements gradually combined

into a harmonious whole, still preserving, however, some traces of their original manners and descent.

An ardent spirit of heroism soon became characteristic of the people. Great glory was attached to the names of Hercules, Jason, Perseus, and Theseus. They were indeed so highly revered by their posterity as to be made demi-gods. Bold lyrical strains celebrated their services to mankind; rehearsed the adventures connected with the Argonautic Expedition, 1300 B.C.; the campaign against Thebes, 1225 B.C., by the allied powers of Peloponnesus; and finally, the various excursions in quest of booty along the coast of Asia Minor. The whole of the two centuries, 1400–1200 B.C., was so marked by valorous exploits, and a devoted attention to the practice of warfare, as to have received the appellation of the Heroic Age. It was only by Agamemnon's confederacy with all the Greek states, in view of an attack upon Troy, 1194–1184 B.C., that Greece became a consolidated nation. After the fall of this city, the history of Greece becomes more reliable. On their return, the Greeks turned their arms against each other. The Dorians (Heraclidæ) invaded the Peloponnesus, 1100 B.C., whence they had formerly been expelled by the inhabitants (the Pelopidæ). Wearied with internal strife, many of the Greeks moved over to the coast of Asia Minor. The numerous small kingdoms, no longer able to sustain themselves, fell to ruin. With the exception of Sparta, they became republics, every city constituting the nucleus of a separate independent state.

Though this tended to sever the Greeks from each other, they nevertheless possessed several incitements to union. Their language and religion, their annual sports, the Olympic games, and especially the Amphictyonic Council, served as national bonds which could not be easily sundered. Art and science began to be developed; a spirit of freedom took firm hold of the popular mind. Yet party strife rose high among them; and having no state laws in common, they were not formidable antagonists to foreigners, except when mutual interest compelled them to make common cause, and to form strong alliances.

Sparta and Athens held the supremacy over the other states. Each of these powers named its constitution from its own lawgivers: Lycurgus, and Draco and Solon. Sparta, after a bloody contest of fifty years, conquered Messenia, and thus laid the foundation of her subsequent eminence. Athens suffered from civil broils between the lower and higher orders, until Pisistratus assumed the reins of power, 561 B.C. Fresh disturbances arose under Hipparchus, a son and successor of Pisistratus. Hipparchus was banished, 510 B.C. Ostracism was introduced, but the measure did not restore quiet, which was still more interrupted by a war with Sparta. Ostracism was the system of banishing too powerful citizens for ten years. The votes for this banishment were written on shells, which was the cause of the appellation (*ὀστρακισμός*, a shell).

After all, these commotions may have had their use in the preservation and training of a superior courage, a quality soon to be brought into requisition by the Greeks, who were called to defend their liberties and homes against the hosts of Persia. In the tedious and sanguinary wars that

followed, the Greeks displayed a rare intellectual and physical energy, which nothing but intense patriotism and zeal for liberty could have prompted. Then the Greek mind seems to have received its first high and glorious impulse: an impulse which called forth the most perfect works of the Fine Arts.

With the introduction of art and refinement came also their almost invariable accompaniments: luxury, extravagance, licentiousness. The Persian campaigns opened the way to oriental voluptuousness, which tended greatly to the degeneration of the Greeks.

Fears of foreign subjugation had united the states in defensive alliance; but when the danger had subsided, the former internal animosities returned with increased acrimony, viz. the discord of the neighboring provinces, caused by envy and jealousy, and the special interests which separated the smaller states from those of Sparta and Athens. When Sparta ceased to promote the contest against Persia, Athens persevered, until, at the expense of her allies, the islands of Scyros, Naxos, and Thasos, she acquired the sovereignty of the seas, and even dictated peace to Asia, 449 B.C. Under Pericles, her power continued to rise, and her neighbors, Megara, Eubœa, Samos, and Corinth, felt her oppression in no small degree. Sparta found herself disregarded, and her power diminished. In all the states, contentions arose between the aristocracy and the democracy. Sparta lent assistance and protection to the aristocratic party (the oligarchy), while the democracy found strong support in Athens. Thus Sparta still retained influence over some states, and even subdued several. At length all the forces of the Peloponnesus rose against Athens, 431 B.C., which was compelled to yield, and henceforth Sparta held the supremacy of Greece from 404–371 B.C. For this success she was indebted to the genius and talents of Lysander.

The inhabitants of the conquered cities and islands soon felt the yoke of the rude Spartans. A new war with Persia required great subsidies, which had to be furnished partly by them, a circumstance which made this dominion still more painful.

Agésilas wanted to penetrate boldly into Persia, and would probably have completely overwhelmed that empire, if the Persians had not succeeded by bribery in counteracting his plans, while they more and more agitated the Greek people at home. The war of Corinth ensued, 394 B.C. The Spartans fought the memorable battle at Coronea, and won a splendid victory over the Thebans. But Corion of Athens defeated the Spartan fleet at Cnidus. Athens, after this, had the superiority, and envy induced the Spartans to conclude a dishonorable peace with Persia, 387 B.C. This treaty took its name from Antalcidas, the Spartan Ambassador by whom it was negotiated.

Thebes was forced to join it, and soon felt the insolence of the Spartans, who, during divisions among the democrats and aristocrats in Thebes, took possession of this city, and besieged Cadmea. But the fall of Sparta soon ensued. Under Epaminondas the Thebans gained a glorious victory, 371 B.C., and Thebes rose to be the first and most important state of Greece. With the death of Epaminondas, 362 B.C., the flames of civil strife in Greece were temporarily smothered.

About this time a new power sprang into note, and became a dangerous opponent to Greece. The Macedonians, under Philip I., after having conquered the neighboring territories, made themselves masters of Greece, 338 B.C. This monarch, however, treated the Greeks with forbearance and kindness, and gained their co-operation in his plan of punishing the Persians; but before any important results had accrued, his life was brought to a close, and his kingdom descended to one more formidable than himself, his son Alexander the Great. The subjugated people once more arose, but were soon compelled to humble themselves before the powerful conqueror, the Spartans excepted, who refused to acknowledge the sway of Alexander, as they had before that of Philip. Alexander now accomplished his father's plan of uniting with the Greeks in an expedition against Persia. He was victorious, and thus became master of Asia Minor, 334 B.C.

After his death, 322 B.C., the Greeks again attempted to liberate themselves from the tyranny of Macedonia. This effort, however, was not only vain, but their state of bondage became even more abject. However, disturbances in Macedonia afforded several Greek states an opportunity of disengaging themselves more or less from that empire. They formed the Achæan league, 281 B.C., which was followed by the league of the Ætolians. These confederacies maintained for a while the dying spirit of freedom, and served as a strong check to the encroachments of Macedonia. But nothing could appease the old jealousies which gave rise to fresh discords. The war of Cleomenes resulted, 227-221 B.C., and it was followed by that of the Ætolians, 221-217 B.C. Thus, Philip III. of Macedonia acquired the ascendancy, and maintained it, until the Romans succeeded in gaining adherents, and caused the formation of two leading parties: the Roman and the Macedonian (the old Ætolian), 211 B.C. The latter were by far superior, until their forces were completely routed at Cynocephalæ, 197 B.C., and the Greeks proclaimed their independence at the Isthmian games, 195 B.C.

The Ætolians, meanwhile, unwilling to submit to the guardianship of the Romans, invoked the aid of Antiochus III., king of Syria, against their new oppressors, but were obliged, by a disgraceful peace, to acknowledge the power of Rome, 189 B.C. The Achæan league furnished the only remaining obstacle to the Roman arms; but after many a contest and much oppression, it fell and was dissolved. All Greece, under the title of Achaia, became a Roman province, 146 B.C. Athens, as a reward for her devotion to the Romans, enjoyed several privileges, but when she sided with Mithridates, king of Pontus, in his quarrel with the Romans, she was attacked, subdued, and plundered, and for ever deprived of her liberties, 81 B.C. Thus sank at last this beautiful abode of art and science.

The social arrangements and internal relations of the Greeks in the Heroic Ages, were based upon unions formed by families and tribes: at the head of the state, as of a family, one was chief (king). He represented the highest authority of government; he led the army in war; kept up order and discipline according to established usage; presided at the sacrifices made in the name and in behalf of the state; and made general provision for the maintenance of religious cere-

monies. His office was hereditary, though in a great measure the succession was regulated by the voice of the people and the will of the gods. The chief qualities demanded in the candidates were, bravery, physical strength and beauty, generosity, and experience. Such qualities, which their predecessors had possessed, contributed towards giving them with the people the name of having descended from the gods. Various privileged classes, as it were, the nobility of the state, held rank next to the king. Those among them who were distinguished by age, experience, and courage, and other brilliant qualities, were allowed to assist the king with their advice and admonition in public affairs, and to restrain him from acts of tyranny; but the great mass of the people enjoyed no share in the government.

After the heroic ages, we find this form of government entirely abolished in some states, and in others tending to decline. As the history of Greece is sufficiently comprehended under the accounts of Sparta and Athens, so their constitutions may serve as fair specimens of all the rest. We may remark, generally, that in the principles of political government, the Doric states imitated Sparta, and the Ionic, Athens.

The constitution of Sparta was a mixture of monarchical and representative powers. Kings indeed were chosen and invested with royal prerogatives; but their acts were in a measure controlled by the popular assembly. This body had an undisputed vote upon all propositions emanating from the two kings and twenty-eight elders, each of whom must be at least sixty years of age. They were termed the Council of the Elders. The kings performed the functions of priests, and in battle marched at the head of the army.

Another class of magistrates took the name of Ephori (supervisors). They were five in number, and were elected annually. The kings were bound to submit to their judgment, and might even be dethroned at their pleasure.

Lycurgus was the great Spartan lawgiver. The basis of his constitution was equality among all citizens. The uniformity of fortune which this required he endeavored to produce by a an equal distribution of landed property. As means to this end he also propounded laws regulating clothing, food, and dwellings, the substitution of iron for a gold and silver currency, and the education of youth towards a common aim, that of becoming brave warriors.

The constitution of Athens emanated from Solon. His system contemplated not so much the quality as the liberty of the people. No ruler was admitted; Athens was a genuine republic.

The people were divided into four classes, differing from each other not less in number than in rank and importance. 1. The *free citizens*, whose numbers were not allowed to exceed 20,000. 2. The *free commoners*, immigrants to whom the prerogatives of the free citizens were refused, but who received protection from the latter. 3. *Strangers*, persons who merely sojourned for a short while in the city, without making it their place of residence. 4. *Slaves*, most of whom were captives of war, and who were

subjected to actual bondage. They met with a kinder treatment in Athens than in the other states.

By the Athenian constitution the administration of the government was vested in the Assembly of the People, the Archons, the Grand Council, and the Areopagus.

The Grand Council consisted of 400 members, chosen annually, by lot, from the citizens. They were required to be of unimpeachable integrity, and at least thirty years of age. On them devolved the actual charge of the government. They also proposed laws, but had to give an account to the people every year, and to undergo the penalty which the assembly of the people had a right to impose upon them in case of bad administration.

The Archons, who before the time of Solon had been almost as kings, under his code only exercised judicature in special branches of jurisdiction.

The Areopagus had existed ever since the most ancient times as a kind of tribunal for capital crimes; but Solon assigned to it the charge of supervising the management of the state, the conduct of public officers, and the observance of laws and morals, &c. This court even acquired the power of rejecting decrees of the popular assembly, when it deemed them unjust or unlawful. Thus it formed a barrier to the people's passions and thoughtlessness. The Areopagus was chosen from former archons whose administration had given no cause for complaint. It numbered more than 300 members, who, when once elected, retained their dignity for life. They held their sessions publicly in the open air, which gave their proceedings an air of authority and solemnity. *Pl. 8, fig. 5*, the Areopagus in session.

Solon had paid particular attention to the administration of justice, and laid it down as a principle to let the greatest possible number of judges vote in cases of litigation. Besides this, the power lay in the people to ostracize or banish for ten years a man whose ambition appeared to threaten the liberties of the state. The Athenians, finally, had a written system of jurisprudence, which was highly prized. Part of it was even subsequently incorporated in the laws of the Roman and other nations.

An account of all matters relating to Grecian warfare will be given under the head of Military Sciences, and the religious ceremonies will be treated of under Mythology. Here we only refer to *pl. 27, figs. 19, 20*, Greek War-leaders.

The laws of Lycurgus prohibited the Spartan citizens from carrying on any trade. War and hunting constituted honorable employments. The helots (slaves) tilled the soil, and also provided for the necessities of life. Rough iron, and sometimes iron coin, constituted the sole currency. Simplicity of manners, and frugality of living, continued to characterize the Spartans up to the close of the Peloponnesian war; but after that date, when an intercourse began to grow up between Asia and Greece, the infection of eastern luxury reached even to Sparta, and the early poverty was succeeded by a season of private and public wealth.

The wealthy Athenian citizens had always devoted themselves more

to public than private affairs, leaving the care of agriculture and trade to the slaves. Many, however, would inspect their workmen, nay, participate in manual labor, especially in husbandry. Mining was left to the slaves. Besides marble quarries, silver was found in great abundance in the mines of Mount Laurion. The poorer citizens would follow some trade, whilst the opulent had factories where their slaves were set to work. The rights of labor were unrestricted. Several circumstances conspired to favor commerce, and thereby trade; among these we may mention the happy position of the country, and the admirable harbor of Athens. Commerce might have risen to still greater importance had not the Athenian love of conquest given another aim to their pre-eminence at sea. Besides, there was a law prohibiting the importation and exportation of certain products in time of war.

The currency used in trade was of gold, silver, copper, and iron. Originally these metals were not coined, and the value was estimated by the weight. But at the time of Solon coins had come into general use, and in Athens they were stamped with an image of Minerva with the owl. The Athenian currency served as a model for that of surrounding states, and throughout all Hellas the talent and mina were used as conventional standards of value: 1 talent = 60 minæ (about \$1000); 1 mina = 100 drachmas; 1 drachma = 6 oboli; 1 obolus = 8 chalci; 1 chalcus = 7 lepta. Gold coin bore a proportion to silver of 1 : 10; at other times 1 : 12, $12\frac{1}{2}$, and even 15. Down to the half obolus silver was used; the quarter obolus sometimes silver, and sometimes copper; while the smaller coins were made of copper only.

Prior to the time of Solon coins of the same denomination were heavier than under him and his successors, for he coined 100 drachmas from the same amount of metal that used to give 72 or 73 drachmas. The drachma of Ægina did not suffer reduction, and in Eubœa the coin underwent less alteration than in Attica.

For fac-similes of several Grecian, Macedonian, and other coins, see *pl.* 11, *fig.* 24, a double drachma, didrachma, *obverse* of a silver coin of Ægina; *fig.* 25^{ab}, Syracusan coins; *fig.* 26, *obverse* of a Theban silver coin; *fig.* 27^{ab}, Alexandrian silver coin of four drachmas; *fig.* 28^{ab}, silver coin of Crotona; *fig.* 29^{ab}, golden octodrachma of Ptolemæus I.; *fig.* 30^{ab}, Athenian silver tetradrachma; *fig.* 31^{ab}, silver tetradrachma of Alexander the Great; *fig.* 32^{ab}, gold double drachma of Philip II. of Macedon; *fig.* 33^{ab}, gold drachma of Hiero II.; and *fig.* 34^{ab}, Parthian silver drachma of Arsaces VI.

Manners and Character of the Greeks. The Greeks of the heroic age lived midway between barbarism and civilization; but owing to favorable circumstances, they had, unlike other nations, the advantage of a free development. It cannot be denied that quarrels were adjusted by the law of retaliation, and violent and bloody scenes frequently occurred; but so sensitive was the susceptibility to praise or censure, that even the superiors did not venture to risk their characters by deeds of oppression. Hospitality was always a religious virtue; and wandering minstrels, who were held in high esteem by people and princes, contributed essentially towards the moral

refinement. The public games were another powerful bond of nationality. The grand games were four; the *Olympic*, *Delphic*, *Nemean*, and *Isthmian*, all possessing at first only a local importance, but afterwards raised to the rank of national festivals. They became a centre of union for the most distant states, for to them repaired visitors from all parts of the country, by land and by sea.

The *Olympic* games were celebrated in the grove of Altis, in Pisatis. They derive their name from the sacred edifices called Olympia, which were situated near the grove. The games were held at intervals of five years. They lasted from the 11th to the 15th day of the month of Hekatombæon, at the time of full moon after the summer solstice. They were celebrated in honor of the Olympian Jupiter. During the solemnities hostilities were universally suspended. Racing originally formed the leading contest, though, at a later period, other exercises were added. Special judges were appointed to decide who had won the prize, and if they failed to agree, the case was submitted to the grand Olympic Council. The only reward of the victor was an olive wreath or crown.

These games were established by Klimenos, about fifty years after Deucalion, and suppressed by the Emperor Theodosius, 394 A.D. From 776 B.C., time was reckoned by Olympiads. *Pl.* 9 represents several scenes connected with the Olympian performances. *Fig.* 7, a ball-slinger; *fig.* 8, a discus-slinger (the discus, or quoit, was a heavy stone or iron disk, and the play consisted in throwing it in a curved line to a fixed mark); *fig.* 9, a ring or hoop-racer; *fig.* 10, archers; *fig.* 11, a lancer; *fig.* 12, a leaper; *figs.* 13 and 14, rope-walkers; *fig.* 15, wrestlers; *fig.* 16, boxers; *fig.* 17, foot-racers; *figs.* 18–20, horse and chariot racing.

Apollo is said to have founded the Delphic or Pythian games after he had slain the dragon and taken possession of the Delphian oracle. That was the reason why these games were always consecrated to him. This festival was celebrated on the Crissæan Plain, near Delphi, and like the Olympian, occurred every fifth year, in the spring of the third Olympic year. At first the exercises consisted of music upon the guitar alone; the flute was admitted subsequently, and so were gymnastic performances. They were regulated by the Amphictyonic Council.

Tradition ascribes the founding of the Nemean games to Hercules, son of Alcmena, after his defeat of the Nemean lion. He dedicated these to the Nemean Jupiter. They were celebrated in the grove of Nemea, between the cities of Cleonæ and Philus, and occurred twice in each Olympiad.

The origin of the Isthmian games is attributed to Sisyphus, who wished to honor with becoming solemnities the death of his nephew Melicertes, or Palæmon. Theseus subsequently revived them, and dedicated them to Poseidon. They were celebrated where the isthmus commences, running from Corinth towards the Scironian rocks. The exercises consisted, as in the three others, of musical and gymnastic contests and horse-races. They took place twice in each Olympiad.

Education. While all Greece enjoyed a fair celebrity for art and sciences, to Athens belongs the glory of precedence in this respect. The

education of a young Athenian lasted until his twentieth year. It was intrusted to the parents, particularly the mother, until the age of seven. At that period the boy passed into the hands of a tutor, who took him to the public schools. Special care was bestowed on the production of a perfect physical and mental organization. The instruction aimed at a high order of liberal and generous feelings and sentiments, and was made up of the arts that bore reference to the Muses, chiefly of music, poetry, eloquence, and gymnastic exercises. The youths studied also the elements of their native tongue, as well as grammar; and later they attended upon the sophists and philosophers, whose information was sought principally with regard to its practical usefulness. *Pl. 7, figs. 17 and 18*, a philosopher and a poet. Originally, rhetoric and philosophy did not compose part of national education; but after the Peloponnesian war, when the influence of a good orator became obvious, the schools of the rhetoricians and philosophers were crowded. Gymnastic exercises would sometimes commence at the early age of seven years. They were performed in the three gymnasia erected by the state. These buildings were large, and surrounded by beautiful gardens. They contained spaces for the exercises, and large rooms for the philosophers, rhetoricians, and sophists. At eighteen took place the declaration of manhood, and the young man was bound over to the service of his country. At twenty he entered upon the full enjoyment of all his rights as a citizen. *Pl. 7, fig. 3*, a Grecian youth; *pl. 10, fig. 1*, the academic grove at Athens; *pl. 9, fig. 1*, a game of manual skill; *fig. 2*, swinging.

The domestic life of the Greeks during the heroic ages was simple, though among the upper classes it was not wholly destitute of a certain elegance. Their food consisted of wheat and barley bread, fruits, milk, the flesh of oxen, sheep, swine, goats, deer, also of poultry and fish. Wine and water constituted the customary drink. Great banquets were among their chief amusements, and served as celebrations of religious and private festivals. The guests were arranged around the table according to a certain order of rank, and the pleasures of the feast were enhanced by singing, dancing, and instrumental music.

The men wore a garment of cloth, without sleeves, which was lifted, when required by their occupation, by a girdle. Over this was thrown a mantle, suspended by a clasp to the shoulders. The inner garment was preferred of snowy white and of fine texture; the mantle, on the contrary, which served also as a covering at night, was of thick cloth, but, nevertheless, richly ornamented. Except during war and in travelling, the feet and head were uncovered. Long hair was worn by the men. The women exchanged the old Doric vestment, with its double girdle or sash, for the simple Ionian garment. This was made of linen or cotton, and consisted of an under robe, with sleeves, above which was worn a state-dress; the latter was very wide, and woven with great art. It also covered the head, and was secured by numerous clasps. At a later period this mode of living and of dressing underwent various changes.

The fare of the Spartans was simple in the extreme, having no object

but the mere assuaging of hunger and thirst. The black soup, a dish composed mainly of blood and onions, was common in earlier times. After the death of Agesilaus, however, Sparta began to acquire a taste for Asiatic luxury. Athens, too, sober and frugal at the time of Solon, from the days of Pericles adopted a costly method of living. During meals the company reclined, according to their rank, upon soft and luxuriant couches, and incense and other fragrant odors perfumed the halls, while vessels of silver and gold glittered upon the tables. The guests were anointed with costly balsam, and their heads festooned with garlands. Various amusements took place during the repast. *Pl.* 8, *fig.* 2, dancers; *pl.* 9, *figs.* 23 and 24, dice; *figs.* 21 and 22, theatrical masks; *figs.* 5 and 6, female jugglers. The Greeks had quite a fondness for magic and jugglery. At the close of the feast a libation of wine was poured out to the gods.

The Spartan dress prescribed by Lycurgus was characterized by great simplicity. The clothing was frequently nothing more than a short mantle; the head was sheltered by a broad hat, a plain sandal covered the foot, and the hand grasped a stout club. The women as yet retained the old Doric habit: a light, thin garment, which did not even quite cover the thighs, as it was left open on the two sides. The natural feeling of feminine delicacy was early suppressed, and women strengthened their bodies by vigorous exercises, with a view to the production of healthy, vigorous children. Later, their freedom of manners degenerated into licentiousness, and they too got a taste for luxury and prodigality. The Ionic style was distinguished for fullness, and training of the state-dress. The hair was tastefully dressed in clustered curls, fastened by costly pins.

Some Greeks wore a state-dress of linen, others one of woollen material. Later, this habiliment was also changed in Athens for the Dorian one, which was shorter and lighter. Usually the dress was uncolored, but at public solemnities a yellow one was worn. The sandal protecting the foot was fastened by a strap. When hunting the Greeks wore a kind of boot.

After the Peloponnesian war the Athenians also introduced a considerable luxury in dressing, such as numerous ornaments for the head and feet, costly colored shawls, and special clothes for the different seasons. The women of Athens appeared in public with a long flowing robe of wool or linen, fastened round the waist by a splendid girdle or sash. In the other states, also, this costume gradually supplanted the Dorian one, which was much freer. In this period women began to put rouge on their cheeks and to paint their eyebrows; they also adorned their heads with flowers. *Pl.* 7, *fig.* 2^{ab}, two Grecian girls; *fig.* 3, a youth; *fig.* 4, a spinner; *fig.* 5, a songstress; *fig.* 6, an Amazon; *fig.* 7, female half-dress; *figs.* 8-13, several Greek female garments; *fig.* 14, dress of a Phrygian; *figs.* 15, 16, two Greeks from Mount Ida; *pl.* 9, *fig.* 4, a Bacchante, or priestess of Bacchus; *fig.* 3, a dancer.

We pass on to the dwellings of the Greeks; and first, the houses of the princes, as being the finest and most costly. The residence of Ulysses, for instance, was surrounded by a wall crowned with battlements. The visitor entered the domestic halls, and passed by a double-gate to the front-yard,

which was paved and surrounded by a veranda. Next followed a suite of rooms for various purposes. The actual dwelling-house contained baths and other conveniences, besides the hall for the men and the apartment where the queen worked, attended by her servants, and which had several contiguous rooms.

When the city was in its infancy, the houses of the wealthy citizens did not differ materially from those of the poorer people. They were small and simple, whereas the city in its prime was embellished by large public structures, and in the time of Alexander the Great the private edifices reached no ordinary elegance. The houses did not rise above two stories, and had in their centre a yard surrounded by a colonnade. The apartments of the men and women were separated. *Pl. 8, fig. 4*, interior of a dwelling-house.

In the age of luxury, the household furniture and vessels of primitive simplicity were replaced by others of more costly material and finish. The elegant forms, fine paintings, and richly wrought vessels were most remarkable. The bowls, goblets, censers for frankincense, &c., sometimes earthen, but mostly of brass and silver, were gorgeously wrought, and frequently of gold set with precious stones. Among all the objects of art of this kind which remain from those days, none have attracted greater attention than the Etruscan vases. They derive their name from Etruria, partly because the Greeks highly prized the vases there made, and partly on account of their design, which was supposed to be of Etruscan origin. They have been brought to light in Campania as well as in Greece, especially in the vicinity of Athens. The material is a fine red clay, the form graceful, and the tracery beautiful, easy, and well drawn. The colors are red on a ground of black. A few have black figures on a red ground, but they are supposed to be the earliest specimens. *Pl. 10, fig. 17*.

We give in *pl. 10* a general view of the Etruscan pottery, implements, and furniture; *figs. 2-6*, chairs and seats of various forms; 7, a round table; 8, water-basin; 9, large water font; 10-12, small drinking vessels; 13-18, vases of several kinds; 19-21, other vases and jars; 22, a jug; 23, bottle for wine or other liquids; 24-27^{ab}, spoons, ladles, and dippers; 28^{ab}, lamps; 29, 30, candlesticks; 31-34, various candelabra; 35, scales; 36, 37, hatchet and axe; 38, a mallet; 39, a hand-saw. Next follows a list of toilette furniture for Grecian women. *Fig. 40*, a casket for ornaments; 41, a sun-shade; 42, a fan; 43^{ab} and 44, metallic mirrors; 45-54, boxes, combs, hair-ties, armlets, eardrops, &c.

In concluding matrimonial alliances, the Greeks attached more importance to the wishes of the parents than to the inclinations of the parties to be united. The youth who asked for a maiden's hand sent presents to her parents. If he was accepted he led his bride home in a solemn procession, preceded by torches. A number of young people of both sexes danced and sang, and the festivity closed with a banquet. A man was allowed to have a plurality of wives, but the principal consort always enjoyed the domestic supremacy.

Marriage was established in Sparta for public utility; it was a union

designed to supply the state with vigorous citizens and defenders. Celibacy and marriage below rank were considered criminal offences. The women were highly respected by their husbands, and were allowed to show themselves in public. That was not the case with the women of Athens; they lived retired, and only appeared in public on rare occasions. They were seen, for instance, at the national festivals, and behaved with great dignity. For the most part they selected the domestic circle as the fittest place for the display of their activity.

Previous to a wedding ceremony the betrothed and their parents offered solemn sacrifices to the patrons of matrimony, Jupiter, Hero, Artemis, and the Parcæ. The marriage ceremonies in course of time became more varied; thus the practice of washing the feet of the bride was introduced. *Pl. 8, fig. 1.*

In all ancient nations a sacred regard was always felt for the dead, and it found its best expression in ceremonies of sepulture. Immediately after dissolution, the relatives closed the eyes of the corpse, and had it washed and anointed. It was then wrapped in the habiliments of the grave, and laid out for the visits of friends. Dirges were sung, and the grief expressed by symbolical actions. The body was then solemnly consumed. In Sparta the obsequies were simple; public demonstrations of bereavement were prohibited, and the period of mourning confined within eleven days. Only the graves of those who had died in the service of their country were allowed monuments and inscriptions.

Among the Athenians, the body of the deceased, after anointing, was folded in a costly robe, and decked with green boughs and flowers. It was then laid out to public view. Before sunset the procession started for the grave. It was headed by a band of music, and none of the friends under sixty years of age might walk in it. In early times it was customary to bury the corpse, but afterwards it was generally burned. The ashes were carefully collected and deposited in an urn. Next followed a libation, accompanied by loud and prolonged wailing. A meal generally closed the funeral solemnities.

The Ceramicus was the common place of burial. The earliest graves among the Greeks were simple caves, or high mounds or elevations above the corpse. These afterwards gave place to tombs, rising several feet, and not seldom surrounded with a balustrade. Marble monuments frequently rose above the dead. The grave-stones of celebrated characters showed ornamental views of the chase, game, contests, races, and sacrifices; and in the interior hung beautiful lamps. Paintings and mosaic work gave a pleasing appearance to the whole tomb. *Pl. 11, fig. 1*, stone tombs of Tarquinii, an old city of South Etruria; *fig. 2*, tombs of Assus in the district of Cephalonia; *fig. 3*, tombs of Ceræa, of which *fig. 4* presents the ground plan; *figs. 5, 6*, elevation of the grave of Orcla; *figs. 7, 8*, ground plan of the same; *figs. 9, 10*, elevation and ground plan of graves in Telmessus; *figs. 11, 12*, tombs of Falerii; *fig. 13*, elevation of monument in Agrigentum; *fig. 14*, section of the same; *fig. 15*, sepulture, with figures and vase; *figs. 16-20*, various urns; *figs. 21-23*, tripods.

2. THE ETRUSCANS AND ROMANS.

Long before Italy came into possession of the Romans, it was inhabited by different tribes, several of whom, later, constituted the Roman people. They came from the north and north-east, and each horde as it entered pushed its predecessors further south, until the whole peninsula was appropriated. We have room only for a glance at the most prominent of these original settlers.

1. The *Illyrians*. These, at an early period, secured a hold in the south, and exercised a species of authority over the various smaller nations around them. The districts of Bruttium and Lucania contained the Ænotrians, Chonians, and Morgetians; while in the east from Metapont to Mount Garganus, dwelt the Messapii, Salentinians, Calabrians, Peucetians, and Daunians. The Illyrian stock appeared further north also. The Pelignians appear as descendants of the Illyrians and Sabines; and Herodotus gives the names of Illyrians to the Venetians.

2. The *Siculi* originally possessed Latium; but in the general movement south, they changed their residence, and at last settled in Sicily, giving their name to the island.

3. The *Aurunci* occupied the region of country lying between the Tiber and the Sicilian Straits, and from the Apennines westwards to the sea coast. Some of their descendants afterwards received the name of Volscians.

4. The *Sabines*, with their descendants the Sabelles, a free, hardy mountain race, occupied the Apennines around Amiternum, in the centre of Italy. The courageous and faithful Samnites, Pelignians, and Marsians, the indolent and cowardly Picenians, the law-loving and deeply religious Sabines, and the plundering and murderous Lucanians, were all united with the Sabelles.

5. The *Umbrians* were a strong nation, possessing the province of Umbria and other districts in the east of Etruria, and between the Apennines and the Tiber.

6. The *Etruscans* differed in every respect from the above-mentioned tribes. They divided the people into two castes, superiors and servants. Prior to the founding of Rome they had acquired wealth and influence by commerce and piracy, but from 500 to 470 B.C., they lost their supremacy on the seas, and were no longer terrible to others. Most authors assign them a Pelasgic origin; they built the old cities on the mountains, and were finally conquered by new settlers from the east.

7. The *Pelasgians*.

8. The *Latins*. At an early period, the Pelasgians, Sabines, Umbrians, Ausonians, and Siculians, commingled in the kingdom of Latium, and from the union originated the Latins. With the history of this people begins that of Rome itself.

8. HISTORY OF ROME.

Tradition affirms, that when Latinus was king of Latium, a Trojan prince, Æneas, landed in Italy, and founded the town of Lavinium, which he named after Lavinia his wife, the daughter of Latinus. But this provoked the jealousy of Turnus, king of the Rutulians. In the war which ensued, Latinus fell, although victorious, and Æneas reigned over the Latins and Trojans, until, in a subsequent war with the Rutulians and Tyrrhenes, he also was killed.

Thirty years after the foundation of Lavinium, Ascanius, the son of Æneas, built the town of Alba Longa, the parent city of Rome. Between Ascanius and Romulus fifteen kings reigned, under whom cities and villages sprang up rapidly.

The fourteenth king, Procus, left two sons, Numitor and Amulius, who were to reign alternately. But Amulius, in order to secure the whole power to himself, banished Numitor, put to death his only son, and compelled his daughter Rhea Silvia to become priestess of Vesta, thus binding her to perpetual celibacy. His scheme, however, did not succeed; for Silvia, notwithstanding, gave birth to the twin boys, Romulus and Remus, whose father, according to the myth, was the god of war, Mars. In his rage, Amulius ordered the boys to be thrown into the Tiber, which at that time had overflowed its banks. The basket which contained the children was deposited by a servant in shallow water, and when the river subsided, the little pair were left high and dry upon the shore. A she-wolf, happening to find them here, suckled them. Faustulus, a royal shepherd, discovered them in this condition, and took them home to his wife, by whom they were carefully reared. While in his family, they followed the business of shepherds, and frequently mingled in the contests of the rustic factions.

During one of these skirmishes, Remus was captured, and dragged before his grandfather, Numitor. The latter discovered his origin, and ascertained from Faustulus the circumstance of his singular preservation from drowning. Remus, uniting with his brother, organized a force which expelled Amulius and restored Numitor to the throne. Of the latter they obtained permission to build a city on the spot where they had lived as shepherds. It was situated on the banks of the Tiber, on the Palatine hill, and received the name of Rome (754 B.C.). While it was building, a dispute arose, in the course of which Remus was killed, and Romulus became absolute monarch.

The language, manners, and constitution of early Rome, indicate that probably other tribes soon made their appearance in the neighborhood, especially Sabines and Etruscans. Then the number of inhabitants was increased by offering refuge to the fugitives and the malcontents of other states. This caused an excess of male over female inhabitants, and Romulus, with a view of obtaining women, invited a large number of Latin and Sabine families to attend a festival which he proclaimed in honor of Neptune; and, during the progress of the games, he

caused a band of Roman youths to carry off a number of maidens, whom they compelled to become their wives. This involved the Romans in a war with their neighbors, in which the Latins were defeated; but the Sabines penetrated as far as the Forum, and were only persuaded by the stolen wives to make peace with the Romans. The Sabines settled on the Capitoline hill, which they had taken, and united with the Roman people under the name of Quirites. Romulus, and the Sabine king, Titus Tatius, governed jointly, until the latter was murdered at Lavinium, when Romulus again acquired the sole power. Not long after, his own life was brought to a close. There is a strong probability that he was killed by the senate, who made the people believe that he had been carried to heaven to take a place among the gods. He was deified under the name of Quirinus.

A year after the death of Romulus, the people elected a king, Numa Pompilius (716-673 B.C.), a wise and peace-loving prince, to whom Rome owed many beneficial institutions and regulations. He was followed by the warlike Tullus Hostilius (673-640 B.C.), who vanquished the Albans, levelled Alba Longa to the ground, and transferred its citizens to Rome, where he made them settle on the Cœlian hill.

His successor, Ancus Martius (640-617), was more pacific. He enacted laws favorable to agriculture, and reinstated the religious ceremonies which had fallen into neglect. The Latins revolted against his government, but he quickly subdued them, demolished several of their cities, and made a number of their inhabitants cultivate the Aventine hill. He extended the Roman possessions to the sea, and founded the town and port of Ostia at the mouth of the Tiber, thus laying the foundation of Roman commerce and navigation. He was succeeded by Tarquinius Priscus (617-578), a Greek, and an ardent lover of the fine arts, who adorned and beautified the city with great taste. During his reign, Rome increased in power by successful wars against the Sabines, Latins, and Etruscans. The sons of Ancus Martius at last murdered him for having robbed them of the succession. The murderers, however, did not succeed him, for Servius Tullius, son-in-law of Tarquinius, ascended the throne (578-534). This king enlarged Rome by annexing to it the Quirinal, Viminal, and Esquilinal hills; he revised the Roman constitution, and made treaties with the unconquered Latin towns, Gabii, Ardea, and others. At the instigation of his unnatural and imperious daughter, Tullia, he was murdered by his own son-in-law, Tarquinius Superbus, who succeeded him on the throne, reigning from 534-510, with arbitrary power and great cruelty. He raised Rome to be the first in the confederacy of the Latin provinces, made peace with the neighboring tribes, and improved the city. By a stratagem he also brought the city of Gabii into the possession of Rome. He forfeited the throne by his despotic acts, for a people so conscious of freedom could not long endure the arbitrary will of any individual. On ascending the throne he had caused some of the most influential Patricians to be put to death. Lucius Junius, a relative of Tarquin, and son of one of the murdered Patricians, had himself escaped death only by feigning idiocy, whence he received the name of Brutus. He had long planned the downfall of tyranny. When, therefore, Sextus, the son of Tarquin,

offered violence to Lucretia, the virtuous wife of Lucius Tarquinius Collatinus, and she, not able to survive such dishonor, put an end to her life, Brutus threw off the mask, and uniting himself with Publius Valerius, Collatinus, and other patriots, assembled the people, showed them Lucretia's bloody corpse, related the infamy of Sextus, and described all the tyranny of the king, who was just then engaged in a war with the Rutulians. When the enraged people were ripe for vengeance, Brutus proclaimed the banishment of the king and his family, and royalty was abolished, 510 B.C.

Thenceforth Rome became a republic. In the place of king, two *consuls* at first called *prætors*, held the chief command. Brutus, and Collatinus, the husband of Lucretia, were the first magistrates under the new system. But Rome did not long enjoy peace. The banished tyrant was not idle. From his first place of refuge, Gabii, he betook himself to Etruria, planned a conspiracy in Rome, and actually succeeded, by the help of an Etrurian delegation, in finding assistants in the city itself, among whom were two nephews of Collatinus, two nephews, and even two sons of Brutus; but the plot being discovered, the conspirators expiated the crime with their lives. Brutus even pronounced sentence of death upon his sons, and they fell under the axe of the executioner. Collatinus wishing to spare his nephews, suspicion of his patriotism began to be entertained both by Brutus and the people; he was therefore regularly deposed, and Publius Valerius succeeded to the office. Valerius rendered himself so popular with the masses that they gave him the name of Publicola (friend of the people). He issued an amnesty for all the partisans of Tarquinius, and thus a great number of noble citizens were restored to the Roman state. But Tarquin had not yet relinquished hopes of regaining his throne; and, with the assistance of the town of Veii, now attacked Rome in person. In the battle which took place near the grove of Orsia, Brutus was killed, but the Romans obtained the victory, which, however, was not very decisive. While Tarquin was seeking further assistance, Valerius, the remaining consul, continued to administer the government alone. He did not act from ambition, but from a desire to accomplish his plans of internal improvement without the opposition of another consul. At the expiration of his year, and when he had carried out his plans, he issued orders for the election of two consuls. The choice fell upon himself and T. Lucretius, the brother of Lucretia.

In the meantime, Tarquin obtained aid from Porsenna, king of Clusium, a powerful city of Etruria. This monarch marched with a great force against Rome. But now the Romans displayed all their valor and patriotism. Horatius Cocles saved the city, by defending, single-handed, the bridge across the Tiber, until it was cut down behind him. Mucius Sævola went by stealth into the camp of the enemy, with the intention of killing Porsenna. By mistake, however, he only stabbed his secretary. In consequence of this deed, he was sentenced to suffer death by fire; but the courage which he showed, by holding his right hand, during a speech to the king, over a pan with glowing coals, and suffering it to be entirely consumed,

made such an impression on Porsenna, that he hastened the conclusion of peace with Rome, though not on very favorable terms to that city.

Upon his return to Clusium, Porsenna sent one of his sons to attack the Latin city of Aricia. This expedition failing of its object, the Romans endeavored to liberate themselves. Porsenna abandoned his efforts in behalf of Tarquin, and allowed Rome to throw off the Etruscan yoke. But all these events had reduced Rome to a state of decay, which encouraged thirty Latin and Sabine cities to form a confederacy and revolt against Rome. In this perplexity Rome was obliged to elect a Dictator, to whom was intrusted, for a time, sole dominion. He possessed the power of fortune and life over the citizens. Titus Lartius first held the office, 449 B.C. Under him and his successor, Aulus Posthumius, the Romans vanquished the insurgents, especially in the memorable battle near Lake Regillus, where the two sons of Tarquin were killed, and he himself, childless, and without hope of regaining the throne, retired to Cumæ, where he died. The Romans and Latins finished by forming a union, 495 B.C., in which both parties obtained equal privileges, and incurred mutual obligations.

With the removal of external difficulties, the old feud revived between the Patricians and Plebeians. It lasted for many years, and crippled the wealth and energies of the republic. The Patricians were forced to yield to the enraged people; and, in order to prevent further abuse of the consular power, two Tribunes were chosen from among the Plebeians. Their persons were sacred, and they had the power of the veto over any law tending to oppress the people.

In the following year (494 B.C.), the number of tribunes was increased to five, and afterwards to ten, and new prerogatives were at the same time accorded. Thus step by step did the Plebeians rise in influence and power, until they secured a list of privileges equal to those of the Patricians. They also obtained the appointment of two *Ædiles*, chosen from among themselves to act as guardians of public safety, and as assistants of the tribunes.

The struggle between the several classes having at length ceased, the Romans could prepare to meet the attacks of their enemies, of whom the Volsci were the fiercest. During the constant wars, the labors of husbandry had been much neglected, whereby Rome was exposed to famine. Hunger itself was endured with tolerable patience, and in seasonable time a supply of grain arrived from Sicily. This relief caused the strife between the classes to break out more violently than ever, for in the senate, Coriolanus proposed that the corn should be sold at cheap rates to the Plebeians only on condition that they would surrender the privileges they had recently acquired. His impeachment followed before the tribunes, who condemned him to perpetual banishment. He immediately fled to the Volsci, whom he easily persuaded to begin a new war with Rome. Many other exiles also made common cause with them against Rome. With a large force they invaded Latium, 488 B.C., plundered a multitude of cities, and committed the fiercest out-

rages on the property of the Plebeians, while the Patricians generally escaped. Coriolanus at last attacked Rome, which would doubtless have submitted, had the terms offered been less humiliating. In the midst of the carnage, a deputation of Roman matrons, among whom were the mother and the wife of Coriolanus, proceeded to his tent, and by their remonstrances and entreaties, saved the city from impending destruction. Coriolanus retired to die in exile. But the class feuds continued to rage with increased violence. The contests with the neighboring states also continued, but were of less consequence than the perpetual strife for supremacy at home. After a number of years, the Plebeians secured to themselves several privileges of the Patricians; and dignities of the state which the latter had possessed exclusively, soon became accessible to the Plebeians. The people were animated by a new spirit; complaints and troubles ceased, the possession of real estate attached them strongly to their country, and Rome was sufficiently invigorated to resume her quarrels with surrounding nations, and thus to extend her dominion by conquest.

Four different times, 361, 360, 358, and 349, B.C., she vanquished the Gauls who roamed about Northern Italy; she also carried on a war of seventy years with the Samnites, who were finally subdued and rendered tributary, 290 B.C. In like manner, the Latins, 338, the Hernici, 308, and the Volsci and Æqui, 304, in succession, yielded to the progress of the Roman arms, and agreed to furnish troops for the defence of the country. The Tarentines, Samnites, Lucanians, Bruttians, Peucetini, and Salentines, all passed under the yoke of Rome, so that in 266 B.C., the Roman standard waved over the whole country, from the Rubicon in the north to the Sicilian straits in the south.

Thus far, physical force and might in battle constituted the chief glory of the Romans. Science and art had accomplished but little. Having succeeded in humbling all Italy, the Romans now began to seek other theatres for the display of their courage; and Carthage, Macedonia, Greece, and Syria, came gradually to acknowledge their supremacy.

The republic of Carthage had extended her dominion vastly. She ruled over nearly all Northern Africa and South Iberia. The sovereignty of the Mediterranean and most of its islands was also hers, and she had even a strong foothold in Sicily; and although Rome and Carthage had concluded treaties of commerce, the rival powers had long watched each other with increasing jealousy. As Rome gradually extended her conquests in a southern direction, she occasionally came in contact with the Carthaginians, whom she especially grudged the supremacy in Sicily, her own valuable granary in time of need. She could no longer allow the rapid aggrandizement of her powerful neighbor. A pretext was not long wanting for the commencement of hostilities. A body of Campanian warriors had been hired by Agathocles, tyrant of Sicily. They boastfully called themselves *Martines* (sons of Mars). After the death of their employer, they roamed about the island without distinct purpose, until they were enlisted by the citizens of Messana. But they killed their employers and took possession of the town. With a view of revenging this outrage, Carthage and Syra-

cuse, long inveterate enemies, desisted from mutual hostilities, and uniting their forces, besieged Messana. The Mamertines applied for assistance to the Romans, who granted it, took possession of the place, vanquished Hiero, king of Syracuse, and the Carthaginians, and then marched their forces upon Syracuse. But Hiero preferred an alliance with Rome to the impending contest, and their united strength was now directed against the Carthaginian cities in Sicily, 263 B.C.

Hitherto the Romans knew nothing of naval warfare. After the capture of Agrigentum, however, they began building their first fleet under Duilius, and gained a victory at sea, 259 B.C. The war was now prosecuted with spirit and vigor in Sicily, Corsica, and Sardinia. Another victory opened the way to Carthage. Regulus penetrated to the very gates of the city (256 B.C.), but was defeated and taken prisoner by Xantippus, and for a time fortune seemed to desert the Roman arms. Several fleets were lost in war or by tempests. Nevertheless, Rome continued the war by land and sea, and was at length victorious under the consul Lutatius Catulus, by whose success Carthage had to yield possession of Sicily and the smaller islands, and to submit to other humiliating terms. Thus ended the FIRST PUNIC WAR.

Carthage, however, soon recovered strength by fresh conquests in a different direction, and had especially found in Spain a new source of power and wealth. Hamilcar Barcas commenced the subjugation of Spain, but fell in the effort, 229 B.C. He was succeeded by his son-in-law, Asdrubal, and at length, 221 B.C., the supreme command was assumed by his son Hannibal. He laid siege to Saguntum, a city of Spain, which was under the protection of Rome, in spite of remonstrances on the part of that power, which, in consequence, immediately declared war. Hannibal longed for an opportunity to redeem an early vow of perpetual hostility to Rome, and was desirous of making it the theatre of his martial exploits. The Romans had already sent one army to Spain and another to Africa, when Hannibal crossed the Pyrenees, marched through Gallia, passed the Rhone, and then the Alps, in spite of the season (it was the month of November), and appeared on the plains of Upper Italy, a terror to Rome. This forced march cost him the lives of 30,000 men, and many horses and elephants; the remnant of his forces consisted only of 26,000 men. In three engagements he was victorious, and then proceeded towards Rome. But conscious of his diminished strength, and feeling how imprudent it would be with such reduced forces to attack the city, Hannibal retired over the Apennines, and through the morasses of the Arno and Apulia to Lower Italy.

In the meantime, the Dictator, Fabius Maximus, hung upon the flanks of the enemy, harassing all his movements, but avoiding a general engagement. He would infallibly have taken the Carthaginian army captive, had not Hannibal, by a cunningly devised stratagem, deceived the Romans as to his movements, and thus gained time to escape from the toils which were closing around him.

The senate, wearied with the procrastination of Fabius, and distrustful of him, appointed Minucius, who had the command of the horsemen, to

lead half the forces, and invested him with the power of dictator. He attacked Hannibal, but was defeated, and would have been annihilated, but for Fabius coming promptly to his rescue. The consuls of the year 216, Paulus Æmilius, and the inconsiderate Terentius Varro, sought to terminate the war by a bold stroke; but they met with a terrible defeat. Paulus Æmilius, with 50,000 Romans, lay dead on the field. This battle secured to Hannibal the support of Southern Italy; but he still delayed marching on Rome with his forces, in spite of the favorable moment. Being without succor from Carthage, he endeavored to recruit his army in Campania, which province, like most tribes of Southern Italy, had broken allegiance to Rome. But here his warriors degenerated and became effeminate. He then negotiated with Philip of Macedonia, and won the new king of Syracuse to the interests of Carthage. This caused the invasion of Sicily by a strong Roman army under Marcellus, who captured Syracuse, after a siege of three years (214–212), and made the whole of Sicily, as well as Sardinia, a Roman province. Hannibal, leaving Capua (in Campania), advanced towards Rome, but soon retired again, and even lost Campania. His brother Asdrubal's army, which was sent to reinforce him, was completely routed near Sena (207), and Hannibal was obliged to retire to the southernmost point of Italy.

Cornelius Scipio, a celebrated Roman hero, conquered the whole of Carthaginian Spain, 210–206, and negotiated alliances with the African neighbors of Carthage, Masinissa and Syphax, which became vastly useful to him in 205, when he, then consul of Rome, transferred the seat of war from Sicily to Africa. Victory upon victory was won by his indomitable warriors, and he at length threatened the city of Carthage itself, whose citizens, apprehending the greatest evil, recalled Hannibal from Italy. Having speedily collected a strong force of horsemen, Hannibal defeated Masinissa, but lost the battle of Zama (202); and in 201, Carthage was constrained to accept the peace dictated by Rome. Thus ended the SECOND PUNIC WAR. Scipio was henceforth known by the surname Africanus.

The power of Rome was now re-established, and she was again enabled to carry war into the countries of her enemies. Her first effort was to punish Philip of Macedonia for his alliance with Hannibal. She sent a strong army into Epirus, and after four years of varying success (200–197), was at length completely victorious, dictating another peace, eventful in its consequences.

Antiochus, king of Syria, having also lent assistance to the Carthaginians, next fell under the vengeance of the Romans, who made war upon him, which, after a short duration, also terminated in their favor, 190. A second Macedonian war against Perseus, was closed by Æmilius Paulus, at the battle of Pydna (168), and in 148 that empire was reduced to the condition of a Roman province.

In our account of Greece, we have already shown on what terms Rome was with that country. Rome no longer hesitated to proclaim herself mistress of the world, and boasted of her power. To her Carthage was at last destined to succumb. By deceit and perfidy Rome provoked a war, and after three

years of incredible exertions, the city of Carthage was utterly destroyed (thus ending the THIRD PUNIC WAR). The territory became a Roman province, and the name was merged in that of Africa, 146 B.C. Some more conquests were made. Rome, occupying, 200 years before, so frail and precarious a position, now stood forth mistress of the world, having extended her sovereignty over all Italy, Sicily, Spain, Sardinia, Corsica, Portugal, Africa, Liguria (Genoa), Gallia Cisalpina, Macedonia, Achaia (Greece), and Asia Minor.

When all foreign excitement had ceased, the old quarrels between the Patricians and Plebeians were renewed. The poor groaned under the oppressions and the assumptions of the rich, and the parties gave vent to their fury in bloody civil wars. A general demoralization also contributed towards the ruin of the republic.

At this time, the wars with the Cimbri and Teutones took place, and the Romans here also were the victors (102-101). To this conflict succeeded the Social War (91-89 B.C.). The Marsi, Peligni, Picentines, Samnites, Lucanians, &c., conspired against the republic. Rome expended some of her best blood and vast treasures, and at last suppressed the rebellion. Next Mithridates VI., in Asia, rose against Rome. Sylla was intrusted with the command of the troops destined for this war; this preference galled Marius, who contrived, by the influence of the tribune Sulpicius, to obtain for himself the command. Sylla, immediately leaving Capua with six legions, appeared suddenly before Rome, 88 B.C. After a violent combat with the Marian faction, he entered the city; procured the outlawry of Marius and eight of his principal adherents; restored the influence of the aristocracy; caused the election of two consuls (Caius Octavius and Cinna, the latter a friend of Marius); and went himself as proconsul to Greece. Marius, after his proscription, had fled to Africa, but even in the ruins of Carthage he was denied refuge. Sylla had scarcely left Rome when new troubles broke out there. Cinna was removed from his office and banished, but soon returned, with Marius, at the head of an army which they had succeeded in enlisting, and Rome was forced to open her gates to them (87). Sylla's adherents were slaughtered, and Marius and Cinna made themselves consuls; the former died soon after (86).

In the meantime, the expedition of Sylla resulted victoriously. He completely conquered Athens, 87 B.C.; overthrew Archelaus, the commander of Mithridates, at Cheronea and Orchomenus, 86 B.C.; and crossing to Asia, concluded an advantageous peace with Mithridates, 85 B.C.

Valerius Flaccus, the successor of Marius in the consulate, now proceeded from Rome in order to oppose Sylla; but many of his adherents deserted to Sylla. Flaccus was murdered by his own subaltern leader, Flavius Fimbria. Sylla only turned his forces against this same Fimbria after having ratified the peace with Mithridates. The troops of Fimbria soon deserted him, going over to Sylla; and Fimbria, in despair, made one of his own warriors stab him. Sylla, after taking the oath of allegiance from the troops, landed at Brindisium, 83 B.C. Metellus, and

the youthful but ambitious Pompey, joined him. After a brief struggle with the adherents of Marius, he conquered Rome, 82 B.C., had himself elected dictator for life, and began a deliberate retribution. He banished his enemies, and confiscated their goods; doomed conspicuous offenders to massacre; and strove to crush the last remnant of democratic power. When all this was accomplished, he voluntarily resigned the dictatorship, 79 B.C.; and retiring to Cumæ, lived only for his pleasure, and died the year after his abdication, of the consequences of his debauchery, 78 B.C.

Whilst the republic was increasing in extent and power in foreign lands, a conspiracy broke out at home, 63 B.C., which threatened the very existence of the republic. Lucius Sergius Catilina formed the design of murdering the consuls, and spreading revolution throughout Italy. He succeeded in gaining for his schemes great numbers of the people, and even a large body of the noblest and most distinguished men. Cicero, then consul, discovered the conspiracy, and by his eloquence and authority in the senate, caused Catilina to be convicted of treason, and obtained against him the sentence of death. But Catilina fled from the city, and after a short time, fell in the battle against the consular legate, Petreius, at Pistoia, 62. Cicero obtained the honorable title of Father of his country.

Pompey, returning from Asia, met with an enthusiastic reception from the people at his triumphal procession; but the senate refused to confirm the grants of land in Asia which he had promised to his soldiers. This opposition induced him to cast himself upon the popular favor.

At this period, the prætor, Julius Cæsar, returned from his province of Spain, where he had subjugated all the tribes as far as the Atlantic Ocean. His influence prevailed in reconciling Pompey and his rival, Crassus; and uniting them with himself in the administration of the government, he formed a *Triumvirate*. In the distribution of offices, Cæsar obtained the provinces of Cis- and Trans-Alpine Gallia, with the command of four legions for five years. He immediately set out to his station, with the design of subduing other countries; encountered the Helvetians, Belgians, and Aquitanians; crossed the Rhine, and fought with the German hordes under Ariovistus; penetrated into Germania and Britain, and laid the foundation of its future subjugation; and, during these exploits, organized an army which might one day, if required, be employed against Rome itself.

In the course of these wars, he obtained, through the friendship of Pompey and Crassus, an extension of his proconsulship in Gallia for five years. Pompey was appointed to Spain and Africa, while the rich and grasping Crassus received Syria. The latter began a war against the Parthians, in which he fell, with 30,000 men, near Carræ, 53 B.C.

Pompey, now too late, became aware of the growing ascendancy of Cæsar. As a check upon his rival, he managed to have himself elected consul without colleagues (52). He acted as in possession of individual power; secured, the next year, the election of the consuls from among his friends; and, while he himself was consul in Rome, governed Spain as a province.

He required Cæsar to disband his army and return himself to Rome, if he had any claims to the consulship.

The tribune, Curio, however, bribed by Cæsar, proposed that both consuls should dismiss their armies. Cæsar disbanded two legions, but the senate demanded the dispersal of the entire army. Curio and Antony interposed objections, and, when threatened with imprisonment, fled to Cæsar's camp, at Ravenna, Cæsar being considered the protector of democracy in opposition to the haughty Pompey. He passed the Rubicon in arms, a step which no commander had ever before ventured upon, without the permission of the senate. Pompey, who had made no preparation to oppose his march, fled to Epirus. He had boastingly said, that he only needed to stamp with his foot on the ground, and legions would be at his command. In sixty days, all Italy was in the possession of Cæsar, and the troops of Pompey in Spain were partly vanquished by his warlike skill, and partly won over by his eloquence.

In the meantime Pompey had raised an army in Macedonia of 70,000 men. Returning victorious to Rome, Cæsar departed immediately for Greece. At first he fought with indifferent success, but finished by completely defeating Pompey at Pharsalia, 48. Pompey fled to Egypt, where he was soon after murdered.

Cæsar followed the vanquished hero. He intended to reinstate Queen Cleopatra, who had been banished to Syria; but he was pressed hard by Ptolemeus, until the latter was accidentally drowned. Cleopatra won him by her charms; he decided the disputes about the succession in her favor, and remained a year at her court.

At length a revolution in the Bosphorus by Pharnaces called Cæsar to Asia. Pharnaces being murdered, he suppressed the rebellion without a single battle. His victory, however, over the party of Pompey in Africa was not so easily won, but at last he gave them a total overthrow at Thapsus, 46 B.C. Scipio, Juba, king of Numidia, and the republican Cato of Utica, destroyed themselves in despair at their defeat.

Cæsar was now chosen dictator for ten years. He ordered new colonies for 80,000 citizens to be founded, and the cities of Corinth and Carthage to be rebuilt, and then set out for Spain, in order to crush the rest of Pompey's party. He accomplished this only with great effort, 45 B.C.

His fifth triumphal procession followed his return home. He was hailed "Father of his Country," and created dictator and imperator for life, and consul for ten years; and, to complete his honors, the senate conferred upon him the additional offices of sole censor and pontifex maximus. His person was declared inviolable, and thus he had unlimited authority, though the people were deceived by the republican form that was still retained. He was exceedingly popular, and the senate was subordinate to his will. He was almost idolized. The unbounded homage disgusted even himself. But a true republican spirit was yet alive in some men. And when a proposal was made that Cæsar should receive the title of king in all conquered countries, Brutus and Cassius headed a conspiracy, 44 B.C. The conspirators approached his golden chair in the senate, and under the pretence

of preferring a petition, tore off his mantle, and pierced him with twenty-three wounds. When Cæsar saw among his murderers his friend Brutus, he covered his face with his mantle, and expired near the base of Pompey's statue.

Instead of joy and freedom, the republic was now pervaded by new terrors and anarchy. The senate fled; but the new consuls approved the murder. Marcus Antonius, however, aroused the indignation of the citizens, and the assassins were compelled to fly for their lives. Antonius strove to become Cæsar's successor, but he found a powerful competitor in the young Caius Octavianus, the nephew and heir of Cæsar. Antonius wanted to withhold his inheritance from him, but he was supported by the senate. The people also adhered to him, and Cicero and the army were soon won. So Antonius left Rome, and went to the Cis-Rhenish Gallia, with the intention of wresting this province from Decimus Brutus, 44 B.C. Cicero declared him a traitor to his country. The consuls Hirtius and Pansa were sent to meet him; they conquered, but fell, at Mutina, 43 B.C. Antonius fled to Trans-Rhenish Gallia. Octavianus led the army in triumph back to Rome, and claimed the consulship. His ambitious views now began to be apparent, but still he actually, in 43 B.C., formed a new triumvirate, with Antonius and Lepidus. The latter was a man of little worth, but had risen high by favorable circumstances. They resolved to divide the provinces among them, to avenge the murder of Julius Cæsar, and in fact to destroy the republican party. To obtain money proscriptions followed. Lepidus even sacrificed his brother; Antonius his uncle; and Octavianus his former protector Cicero, who received the death-blow, 42 B.C.

Brutus and Cassius had gone from Asia to Macedonia. Antonius made a successful onset upon Cassius. Brutus, however, quickly compelled Octavianus to retreat. Cassius, taking the horsemen of Brutus who hastened to his succor to be enemies, and supposing all was lost, killed himself. At the end of twenty days, Brutus risked a new battle, but losing it, committed suicide. Thus the last republicans died one after another. The youngest son of Pompey had also fallen shortly previous in the war of Sicily.

The triumvirs now turned their arms against each other. Lepidus at first supported Octavianus, and therefore laid claim to increase of power; but the latter easily persuaded his army to desert him, and succeeded in expelling him from the triumvirate.

Antonius, the conqueror at Philippi, crippled the strength of Asia, made Herodes tetrarch of Judea, and bade Cleopatra appear before his court in Sicily, to defend herself against the charge of having befriended Cassius; but when she appeared in most luxuriant apparel at Tarsus, he became a slave to her charms, sent his wife back to her brother Octavianus, and gave away entire kingdoms to the Egyptian queen. This induced the senate to declare war, ostensibly against her, but really against Antonius.

To this expedition Octavianus was chosen. After disciplining his warriors by several victories over the Pannonians and Dalmatians, 35-33 B.C., he set out against his brother-in-law. The rival armaments at

length met at Actium in Acarnania. Antony's force was superior to that of Octavianus. A naval battle began, and for a long time the issue appeared doubtful. At length Cleopatra, withdrawing with her fleet, was followed by Antonius, who meanly preferred flight to an honorable death. The fleet surrendered the same day, and the land forces seven days afterwards.

Antonius, forsaken by his troops as well as by Cleopatra, perished by the sword; and Cleopatra, too proud to grace the triumph of Octavianus, caused her own death by the bite of a viper. Egypt was now reduced to a Roman province, 30 B.C. The battle of Actium decided the fate of Rome; the republic was at an end, and Octavianus returned to Rome as sole governor, with unlimited power.

4. ROME UNDER THE EMPERORS.

At the time of Octavianus Augustus, the Roman dominions had reached an unprecedented extent. After having vanquished all his opponents, Octavianus, now more commonly known by the name of Augustus, displayed great affability, moderation, and clemency, and sought to conceal the appearance of his unlimited power. He preserved the external form of a republican constitution, yet, at the same time, concentrated all the principal dignities and offices in his own person. In this way he became in fact emperor (Cæsar), without assuming the title, which was first done by his successor. He called around him prudent, active, and intelligent counsellors, among whom we may mention Agrippa, Cilnius, Mæcenas, and Valerius Messala; and by their aid sought to restore repose and order, introduce wholesome regulations, and arrest the course of prodigality and corruption. Avoiding all new wars, he aimed only at securing the provinces. Thus he entirely subdued Egypt, 30 B.C.; Mæsia, 27 B.C.; Rhætia, Noricum, Vindelicia, and Pannonia, 15 B.C.; and Spain, 25 B.C. His efforts with the Arabians, however, failed, and the attempt against the Germans beyond the Rhine succeeded no better. Germany then extended from the Rhine to the Vistula, and from the Danube to the North Sea and the Baltic. Its natives were as wild as their own forests, and by their rough exercises and simple fare they acquired a physical vigor which astonished the inhabitants of other countries. Hunting and war constituted their highest pleasures, and when they had peace at home they immediately fell with savage ferocity upon the Roman provinces, and thus became dangerous neighbors to the Romans.

To chastise this predatory race, Augustus despatched his step-son, Drusus, with a vast army against them. He conquered the country of the Cherusci, from the North Sea to the Visurgis (Weser) 11 B.C. But the Germans soon recovered all they had lost, and compelled Drusus to retreat. He next proceeded from Moguntia towards the Elbe, and fought with the Catti, but a fall from a horse ended his life, 9 B.C. His brother Tiberius, and other commanders, continued his undertaking, and for a while hoped, by erecting strong castles and introducing the Roman language and

customs, to maintain themselves. But Arminius (better known as Hermann, a young prince of the Cherusci, educated at Rome, placed himself at the head of the Germans, and destroyed three Roman legions under Varus, who fell by his own hand. This took place 9 A.D., in the Teutoburg Forest, a mountain ridge in Northern Germany (now in Westphalia).

Germanicus, the son of Drusus, 14–16 A.D., achieved several important victories over the Marsi, Catti, and Cherusci, when the jealous Tiberius recalled him, and sent him to Syria, abandoning the design of conquering Germany. Augustus died 14 A.D. His son Tiberius, already co-regent, succeeded to the throne. With him begins a line of tyrants, in the worst sense of the term. The whole reign of Tiberius (15–37 A.D.) presents little more than a constant display of cruelty, dissimulation, and rapacity.

After his assassination, Caius Caligula reigned four years (37–41 A.D.), in whose disposition the height of cruelty was combined with unparalleled folly. As an example, we may mention his attempt to appoint his favorite horse to the consulship. Like his predecessor, he was assassinated.

Claudius succeeded to the throne. Murder constituted his amusement, and he loved to protract the sufferings of the dying. His wives and liberated slaves reigned more than himself. He was poisoned by his own wife Agrippina, 54 A.D.

He was, if possible, surpassed in cruelty by his successor Nero, 54–68 A.D., who murdered his own mother, persecuted and destroyed the Christians, and set fire to Rome for his own amusement, in order to enjoy the sight of unusual distress. With his cruelty he combined a ridiculous degree of vanity. At length the people rose against him in open rebellion, when he fled, and ordered one of his liberated slaves to inflict upon him a mortal wound.

During a period of less than two years, 68–69 A.D., three emperors, Galba, Otho, and Vitellius, succeeded each other, all of whom met with violent deaths.

Flavius Vespasian, 69–79 A.D., restored order and security, increased the dignity of the senate, retrenched public expenditure, and appropriated, in spite of his uncommon economy, money to the rebuilding of public edifices, promoted arts and sciences, and reduced rebellious provinces to subjection. After Augustus, he was the first emperor who met a natural death.

Titus Flavius Vespasian ascended in peace the throne of his father, 73–81 A.D. His reign, though short, was blissful.

Very different in character was his brother Domitian, 81–96 A.D. He was a monster of vice and cruelty, and was murdered.

He was succeeded by Nerva, 96–98. He is the first of a succession of the noblest emperors:—Trajan, A.D. 98–117; Adrian, A.D. 117–138; Antoninus Pius, 138–161 A.D.; and Marcus Aurelius Antoninus, 161–180 A.D.

During his administration, the southern Germans (the Marcomanni) poured in great numbers into Italy. The empire was at that time suffering from pestilence; many legions were destroyed, and it became necessary

to recruit the army with slaves and gladiators. The land was laid waste. The emperor contended with the enemy for thirteen years, with alternate good and bad fortune, and even sold the furniture of his palace to meet the expenses of the war. He died of the plague before the termination of the contest, at Sirmium, on the Danube, 180 A.D.

Under the ignorant and vicious Commodus, his son and successor, the weakness of the empire increased, and became more perceptible to watchful neighbors. The Romans lost their spirit of freedom, exhibited the most wanton profligacy, and cast off all fear of the gods. The soldiers, who stood high in favor with the emperor, abused their influence, became mutinous, changed the emperors at discretion, and were bribed into bestowing the best offices on most unworthy persons. Party strife, invasions of the barbarians, and revolutions of the oppressed provinces, alternately harassed the country, whose power and wealth sank rapidly.

In one hundred and twenty years, from 180–300 A.D., no less than thirty-six emperors reigned over Rome. Of this number twenty-seven were assassinated, three fell in battle, and only six died a natural death.

At the close of this stormy period, the Roman people began to fear that the gods had forsaken them for ever. Their appeals for mercy and succor had all failed. Such a withdrawal of divine protection caused strong suspicion of the power of the old gods, and inclined them more and more towards Christianity, which offered them more solace. The emperors and their governors chastised with increasing severity the converts to the new doctrine, until the course of conversion embraced the emperor himself. Constantine made a public profession of Christianity, 323 A.D., and soon after proclaimed it as the religion of the state. This emperor removed the seat of government to Byzantium (330 A.D.), which he greatly enlarged and beautified, naming it after himself, Constantinople, thus accelerating the decline of imperious Rome.

Constantine died, 337 A.D., and left the empire to his three sons, Constantinus II., Constantius, and Constans. Their avarice and jealousy soon led to fraternal discord and war, of which their captains did not hesitate to avail themselves to procure their own advancement. Constantius survived his brothers, and raised Julian to the dignity of his co-regent, 356. Julian prosecuted a successful war with the Greeks and Allemanni, and, on the strength of his popularity, aspired successfully to the sole command. Constantius turned his forces against him, but dying, Julian ascended the throne, 261 A.D.

Julian returned to Paganism, and tried to obstruct Christianity, but died on an expedition against Persia (363).

After Julian, followed in rapid succession, Jovian, Valentinian I., and his sons, Gratian and Valentinian II. During their reigns, the throng of people on the frontiers of the Roman empire increased. At the same period, the Mongolian Huns emerged from the highlands of Central Asia, and crossing the Volga, pressed on in exhaustless multitudes, their irresistible torrent sweeping all before it. Urged on by the swarms behind them, they soon desolated the rich fields of the Ostrogoths, obliging the latter to fall

upon the Visigoths, and compelling them to abandon their cultivated homes on the Dniester, and settle south of the Danube. This change brought the Goths into contact with the Roman governors, who pressed them hard, when the enraged hordes turned against Constantinople. They defeated Valens at Adrianople, where he was killed on the field, 378, and advanced towards Achaia. Gratian appointed Theodosius in Spain, Augustus of the East and Illyrium. The new emperor, Theodosius the Great, 379-395, made peace with the Goths, and gave them lands in Thracia and Phrygia. After the deposition and murder of Gratian by his captain, Maximus (383), of Maximus by Theodosius (388), the assassination of Valentinian II., and the subjection of his successor, Theodosius remained the sole and last emperor of the united Roman empire. He died 395, and after his death the empire was divided between Arcadius, who received the East, and resided in Constantinople, and Honorius, who, residing at Ravenna, governed the West.

Laws, Institutions, Manners, and Customs of the Romans.

The people were divided into freemen and slaves. Slavery had its origin in war, its first subjects being war prisoners. (*Pl. 13, fig. 1*, an exhibition of captives in the Forum at Rome.) Next came their descendants, and such as had forfeited their civil rights by crime; but above all, many slaves were bought; for, when the Roman sway extended itself, the number of slave-dealers augmented rapidly, and thousands of Greeks and Asiatics were sold in open market. The slaves were viewed not as persons, but as chattels which the masters might sell, transfer, or mortgage at pleasure. Slaves born in the house, or such as manifested shining and useful capabilities, generally received a milder treatment; but the others were the victims of a cruelty so unbounded, that it had at different times to be checked by special laws.

A solemn act of liberation promoted them to the rank of citizens. This act consisted either in placing the name of the slave on the list of citizens kept by the Censor, or in bequeathing to him his liberty by will and testament. However, the freedman was still bound to render his former master certain services as client, and he was punished according to law in case of ingratitude.

Political freedom enured to the Romans either by birth or by acquisition. Those who were born free possessed the largest liberty, and the full privileges of citizenship; while those who were enfranchised still remained, in a measure, dependents of the city authorities.

The Roman constitution, originally municipal, retained this character through all the changes of the monarchy, republic, and empire. Unimpaired civil privileges belonged at first only to such as held their residence within the limits of the city. During the first century, permanent settlers only rose to the grade of citizens, and they were eagerly received under

the kings as well as at the beginning of the republic, as the wars considerably diminished the numbers of the citizens. But by degrees, as the state increased, and the true spirit of republicanism had grown strong, so that it became an object of ambition to be a Roman citizen, only few were admitted to this honor. Later, entire cities obtained the right of citizenship without interfering with their own municipal privileges. All Italian tribes who had been allies obtained that right after the Social War; Julius Cæsar gave it to Gallia; and, in the process of time, even foreign cities and provinces gradually rose to similar equality, until finally all freemen of the Roman empire became Roman citizens. (*Pl.* 12, *fig.* 10, Roman citizen and his wife.)

To express the grand totality of the citizens, the term Roman People (*Populus Romanus*) was employed. They exercised their political rights, especially the passing of laws and the election of officers, in assemblies, to which they gave the name of *Comitia*. In this assembly inhered the whole authority (*Majestas*), and it was responsible to no one.

The senate, chosen from the people, constituted the legislative body, while the executive power was lodged with the magistrate.

Members of the senate constituted a social order (*ordo senatorius*). At a later period, another rank appeared, in the persons of knights (*ordo equestris*). The remaining population formed no particular class, or at least had no special denomination.

The knights originally consisted of such citizens as had served in war, as horsemen; and, as their profession involved considerable expenditure, it was open, of course, only to the wealthy. The possession of a certain fortune, without regard to his connection with either the Patrician or Plebeian order, qualified a man for election to knighthood. The consent of the highest authorities (kings, consuls, censors, or emperors) was required for the admission to the knightly order. This order, in later times, enlarged their prerogatives, and at the courts of justice took their seats with the senators. By their wealth they secured to themselves the farming of the revenues (the most profitable pecuniary speculation at that period), and they became so strongly united by undertakings of common interest, that even in the times of the emperors they were able to maintain themselves as an order.

The senate, as the first legislative body, originated with Romulus, and was composed entirely of the Patrician class. The members were called Senators, or Patres, and at first numbered only one hundred. They were afterwards increased to one thousand, but Augustus reduced them to six hundred. Though at first (until 306 B.C.) none but the Patricians were eligible to the office, the position was, later, also accessible to the Plebeians, and finally the order of knights furnished the majority of the members of the senate. The prerogatives of the senators were not always the same, but the following appear to have constituted their general duties: 1. They regulated the service of religion. 2. They managed the finances. 3. They appointed officers to the provinces: in the times of the emperors only to certain provinces. 4. They could invest individuals with the highest

executive power. 5. With them was lodged the power to conduct negotiations and appoint ambassadors. 6. They bestowed public honors, especially that of triumphal processions. 7. They administered part of the criminal jurisdiction. 8. They appointed the dictator. 9. Lastly, until the legislation of the Decemvirs, they dictated peace and war, and possessed a general command over the army.

As signs of his rank, a senator wore gaiter boots of black leather, to the top of which was affixed a silver or ivory C (centum=100; the original number of the order), and a tunic, marked on the breast with a perpendicular strip of purple. The senators had a conspicuous seat at all the grand spectacles. While on a tour through the provinces, they were attended by an escort of lictors, and might claim honors equal to those of the resident ambassadors. (*Pl. 12, figs. 6, 7*, senators clad in their Togas.)

The term *Magistratus* applied both to the offices of state collectively, and to the incumbents of the several offices. These were considered as great dignities, and were filled by public election.

After the expulsion of the Tarquins, the people annually chose two consuls. At first they were called prætors, and during the year for which they were elected, possessed regal power. While engaged in public deliberations, they occupied a splendid chair of office (*pl. 16, fig. 6*). They carried an ivory rod as a sign of authority, and wore a robe edged with purple (*toga prætexta*). The two consuls enjoyed the chief authority alternately. The principal consul was always *preceded* by twelve lictors, carrying *fascēs laureatī*, or bundles of rods, with an axe in the centre, adorned with laurel twigs (*pl. 14, figs. 15, 16*); the other was *followed* by the lictors without fascēs.

In the time of the emperors the consuls wore an official dress (*trabea*), but the office relinquished much of its power to that of the emperor. When the patricians were obliged to admit plebeians to the consulship, 366 B.C., they availed themselves of the frequent absence of the consuls in war to create the patrician dignity of prætor, and to confer upon that office the management of the jurisdiction.

During the reign of Servius Tullius, a law was enacted requiring a census to be taken every fifth year. For this purpose the people were assembled in the Campus Martius, and all were bound, on penalty of the loss of freedom and property, to report their names, ages, wealth, families, and social condition. In the commencement of the republic the consuls had the charge of this census, but from 444 B.C., it was intrusted to two special censors, who also had to watch over the public morals, could deprive a senator of his seat or a knight of his dignity, and, on some occasions, curtail the rights of other citizens. An appeal from their verdict lay to their successors, and even to the people. The censors exercised supervision over the public buildings, and farmed out the public revenues. The censoria dignity vested finally in the person of the emperor.

When great danger threatened the commonwealth, the Romans appointed a Dictator. The senate was judge of the exigency which demanded the creation of this office. The power of the dictator was very extensive.

Without seeking the consent of the senate, or fearing the opposition of the tribunes, he decided all affairs of the state, and possessed the authority of life and death. After the Macedonian war, however, no instance occurred of the choice of a dictator. Twenty-four lictors preceded him, as well within the city as beyond its walls. Only when there was a dictator, and by him alone, a *magister equitum* was appointed. It was his business to command the horsemen, and act, as it were, as adjutant-general to the dictator.

The above mentioned officers formed the grand council. Other subordinate and occasional officers were: the præfect of the city (*præfectus urbis*), acting during the absence of the consul; *decemviri* (council of ten), appointed to frame a code of laws; *tribuni militum* (council of war); and *triumviri* (council of three).

The Tribunes of the People (*tribuni plebis*) belonged to the minor council. They had to guard the rights of the citizens against encroachments, and their persons were inviolable. At first they only had the right of protest against the arrogations of consuls or senators, but they soon extended their power. Their functions ceased with the republic. Under the emperors their dignity amounted to nothing but the mere title.

Other offices of the minor council were the *Ædiles plebei et curules*, *Quæstores*, &c., who had to regulate the market-prices, the transfer of property, &c.

Under the emperors the *Præfecti prætorii* (governors of the emperor's palace) held a high rank.

We mention finally the commanders of the fleets (*præfecti classium*), and the commander of the seven cohorts which guarded the city (*præfectus vigilum*).

For the assistance of these officers we find, 1, the *scribæ*, who recorded the legislative acts, and preserved the public documents and archives; 2, the *notarii*, who recorded public transactions; 3, the *præcones*, who called the people to the assemblies, delivered the proclamations in these assemblies, conducted auctions, &c.; 4, *lictiores*, who preceded or followed the higher officers in their processions, and executed the judgments against convicts; they bore the fasces already described (*pl. 12, fig. 9*, a lictor); 5, *accensi* and *viatores*, who occupied with certain magistrates the place of præcones and lictors. The latter had originally been messengers who summoned the country senators to the meeting of the senatorial body.

Upon their first entrance on the stage of history, the Romans sought pre-eminence in war, and accordingly the interests of the warrior and those of the state were identical. The consciousness of their strength as warriors made them exercise their civic privileges without detriment to the public spirit of order, which was guarded by a great simplicity of manners, a deep reverence for religion, the stringent nature of the domestic and public laws, and by the high authority of the magistrate. We may characterize the early Romans as being endowed with indomitable valor, contempt of death, love of renown and patriotism, a deep contempt for imbecility, and an aversion to intellectual culture. But when Rome

commenced establishing her world-wide empire, and extending it often by ignoble means, the genuine Roman character was gradually changed and finally lost. Some subjugated Italian tribes contributed to the degeneracy of the Roman people, and Oriental luxury increased the evil. And when Carthage, Corinth, Macedonia, and Asia, yielded up their treasures to the conquerors, extravagance reached a pitch such as would not have been expected from the former character of the Romans. Riches, extorted by fraud and violence, were wasted by the most influential men in the most outrageous manner. The wealthy freely abandoned themselves to drunkenness and debauchery, while the masses of the people were exposed to the horrors and miseries of poverty and disease. They would have starved but for occasional alms which they received from the public treasury, or from the bounty of some of the rich citizens. In the midst of such degradation, it is clear that the populace were easy subjects of bribery, fit instruments for those who needed their assistance in order to secure public honors.

At this period of licentiousness and profligacy the taste for the arts and sciences first manifested itself. It was called forth by the treasures of art which the Romans had brought home as booty, and by the influence of Greek scholars, who were the guests of the wealthy citizens of Rome. The young men henceforth received a Greek education.

Husbandry or agriculture, from the first, constituted the principal branch of industry. To this was soon added the raising of cattle, and consequently the cultivation of grass lands. Much care also was bestowed upon the gardens and vineyards. The mechanical trades were generally despised, and mostly conducted by the poorer classes, foreigners, and slaves. Still the number of mechanics was not inconsiderable. The same low opinion was entertained of commerce. But as the number of knights increased, they assumed the control of commerce and the farming of the revenues. Manufactures did not flourish extensively at Rome, the people contenting themselves for the most part with imported articles.

The traffic of the Romans, like that of all other ancient nations, was limited to barter and purchase with uncoined metals. Servius Tullius first instituted cast coins, but not stamped. The coins were clumsy quadrangular plates of copper, alloyed with tin or zinc. Silver coins came into use 269 B.C., and gold 207 B.C. The principal unit in the Roman money, was the *as*, *as*, *libra*, or pound. It was originally a pound in weight, and was divided into twelve ounces (*uncia*). The Roman pound was to the Paris pound as 32 : 21, and was about equal to eleven ounces avoirdupois weight. The names of the coins were as follows: $\frac{1}{12}$ of an *as* = 1 *uncia*; $\frac{2}{12}$ or $\frac{1}{6}$ = 1 sextans; $\frac{3}{12}$ or $\frac{1}{4}$ = 1 quadrans; $\frac{4}{12}$ or $\frac{1}{3}$ = 1 triens; $\frac{5}{12}$ = 1 quincunx; $\frac{6}{12}$ or $\frac{1}{2}$ = 1 semissis (semi-assis); $\frac{7}{12}$ = 1 septunx; $\frac{8}{12}$ or $\frac{2}{3}$ = 1 bes (bis-triens); $\frac{9}{12}$ or $\frac{3}{4}$ = 1 dodrans; $\frac{10}{12}$ or $\frac{5}{6}$ = 1 decunx, or dextans; $\frac{11}{12}$ = 1 deunx.

The *as* suffered one reduction after another, until, from its original weight of a pound, it was depreciated to $\frac{1}{36}$ of a pound. The common impression on an *as* was a Janus bifrons on one side, and on the reverse

the rostrum of a ship. An *as libralis* (*as æris gravis*, *as æneus*) was equal to about 40 cents, and after its last depreciation, only little over one cent. The denominations of the *as* multiplied, were:—*dupondius*, *sestertius*, *tressis*, *quatrussis*, *quinguessis*, &c., up to *centussis*.

Silver coins, as above remarked, came into use 269 B.C. The pound of silver was worth about \$13 20. It was subdivided into 100 *denarii*, worth at different times from 10 to 18 *copper as* each. The *denar* was also called *bigatus* or *quadrigatus*, on account of the coinage representing a double or quadruple span.

The half-denarius had on one side an image of the goddess of victory, and was therefore called *victoriatus*. The quarter denarius was called *nummus sestertius* (semis-tertius), and was marked LLS, or IIS, or HS, meaning *duæ libræ et semissis*.

Gold, when first introduced, counted 96 *gold denarii* (*aurei*) to the pound, but towards the close of the republic only 40. The value of gold as compared with silver was originally as 10 : 1; in the best days of the republic as 12½ : 1; and under the emperors as 14 : 1. An *aureus*, or *solidus*, as it was called during the empire, was worth 25 denarii.

Large sums of money were usually reckoned by *asses* or *sestertii*. The denarius was originally assayed and stamped after the Grecian drachma; hence the Roman writers frequently use the word *drachma* for *denarius*, even at the time when the denarius had much depreciated in value, and bore to the drachma the proportion of 28 : 25. One thousand sestertii were called a sestertium (about \$35). A very common coin was the sextans. The quadrans was also much used: it bore the image of a ship.

We give fac-similes of several coins. *Pl.* 15, *figs.* 2–10, copper pieces; *figs.* 11–15, silver coins; *figs.* 16–19, gold pieces, all belonging to the time of the republic (consular coins); *figs.* 20–25 exhibit the currency of the empire, viz., *fig.* 20, a copper piece; *figs.* 21–24, silver pieces; and *fig.* 25, a gold piece. *Pl.* 18, *figs.* 43–46, matrices for coins and medals; and *figs.* 47–56, Gallic coins and medals.

In the training of the young, in ancient times, the improvement of the body rather than of the mind was considered of importance. It consisted for the most part in instilling early the habits and principles of an honest citizen; also in rehearsing old ballads and the laws of the Twelve Tables. But when arts and sciences had been introduced by the Greeks, they procured Greek slaves (*pædagogi*) to instruct them in the elementary branches, whereupon they were sent to schools to acquire knowledge of different kinds, as grammar, rhetoric, philosophy, and mathematics, without, however, neglecting regular gymnastic exercises. At the age of fifteen the young Roman was declared a citizen, and solemnly invested with the *toga virilis* (*pl.* 12, *figs.* 11, 12, Roman youths). After the ceremony he continued his previous style of training, but enjoyed access to the conversation of great men, was present at public transactions, and by foreign travel, especially visiting Greek cities, he completed his preparation for the duties of manhood and active life.

The dress of the Romans was at first very plain; consisting of the *toga*

and tunic for both sexes. These remained the costume of the men, but the increase of luxury made many additions to the attire of the females. The toga was a wide gown, or mantle, of an almost circular form, without sleeves. It covered the left arm, but permitted the right to be free. It was usually of wool, but the color and ornaments varied according to the circumstances of the wearer.

Other and peculiar dresses were the following: the *lana*, *lacerna*, and *pænula*, mantles used in winter, or in travelling; the *sagum*, or sack, a short thick cape, worn in war; the *paludamentum*, a Grecian purple cloak, worn by the commander-in-chief; the *trabia*, a species of toga worn by the knights and augurs.

The tunic was worn under the toga. It was usually white, sometimes colored, without sleeves, and of wool. It was fastened with a girdle (*cingulum*), and reached below the knees. It constituted the only clothing of the poor, and it served, without the toga, as a suitable apparel in the house of the wealthy. The tunic of the senators (*pl.* 12, *figs.* 6, 7) was marked upon the breast by a broad purple stripe, that of the knights by a narrow one (*clavus*).

Except in journeying, or during bad weather, all the Romans went bareheaded. The feet were covered in the house by leathern sandals (*solea*, *crepida*), in walking or travelling by shoes more or less high (*calceus*).

The hair and beard were allowed to grow prior to the introduction of Greek fashions, when the beard was shaved, and the hair cut, anointed, and curled.

Distinguished and wealthy Roman women usually wore, besides the under-garment (*indusium*), a costly dress (*stola*), and over this a sort of cape (*palla*). They also adorned their persons with rings, necklaces, ear-drops, head-dresses, ribbons, &c. *Pl.* 12, *figs.* 13–15, Roman matrons; *fig.* 16, a Roman maiden; *figs.* 17–29, head-dresses of Roman matrons and maidens; *figs.* 30–32, head-dresses of the men. The dresses of the emperor and empress did not vary essentially from those of the nobility. We represent, *pl.* 12, *fig.* 1, a Roman emperor without his arms; *fig.* 2, the same in his war-cloak; *fig.* 3, the emperor arrayed for the sacrifices; *figs.* 4 and 5, Roman empresses.

In early times the dwellings of the Romans were very plain and small; but after the Punic wars, and particularly in the time of Sylla, private mansions of great magnificence were erected. The country-seats especially showed much elegance. The dwellings had flat roofs, and only one story.

The fare of the ancient Romans was prepared with the greatest simplicity and frugality; but in later years richness and costliness increased also in this respect. Towards the end of the republic, and in the days of the emperors, their luxury and voluptuousness excelled even that of the ancient Asiatics. For their meals the rich Romans had special apartments. The tables were quadrangular, and had on both sides soft couches. In the time of the Cæsars the table took the form of a semicircle (*pl.* 16, a Roman feast; *figs.* 2 and 3, couches). Originally wine was

rarely drunk by the men, and altogether avoided by the women; but, subsequently, both Italian and foreign wines, and especially those from Greece, were habitually drunk at meals. Various games and amusements were indulged in during the meals, as dice, buffoonery, music, and dancing (*pl.* 16, *figs.* 58–62, various forms of dice).

A number of vessels, ornaments, and domestic utensils, are represented in *pls.* 16 and 17. Thus *pl.* 17, *figs.* 8–10, urns and vases finely wrought; *figs.* 11 and 12, large water-bowls; *figs.* 13–15, vases on tripods; *figs.* 16–19, candelabra; *figs.* 20–22, pitchers and flasks; *figs.* 23^{ab}, 24–26, bowls; *figs.* 27–30, lamps; *figs.* 31–33, torches; *fig.* 34, case for the preservation of manuscripts; *fig.* 35, basket; *figs.* 36–41, kitchen utensils; *figs.* 42–46, drinking vessels; *figs.* 47 and 48, knife handles; *figs.* 49 and 50, sickles; *fig.* 51, *congius*, or measure for liquids (8 congii = 1 amphora; 1 congius = 161.3625 cubic inches); *fig.* 52, grain measure (*modius*, bushel); *fig.* 53, granite bath; *figs.* 54 and 55, skimming ladles; *figs.* 56–59, articles connected with the toilet; *pl.* 16, *fig.* 4, folding chair; *fig.* 5^{ab}, chairs; *fig.* 7, table; *figs.* 8 and 9, candelabra; *fig.* 10, Palladium (vessels supported by statues of Minerva); *fig.* 11, font; *figs.* 19–21, bowls; *figs.* 22–25, fonts supported by tripods; *fig.* 26, sarcophagus; *fig.* 27, domestic altar; *figs.* 28–34, clasp-pins and rings for women; *figs.* 35–47, finger and ear-rings; *figs.* 48, 49, styli, instruments for writing and engraving; *figs.* 50, 51, seals; *figs.* 52^{ab}–57, keys; *figs.* 63–65, knife and fork handles.

The Carthaginians, Phrygians, Sarmatians, Germans, Gauls, and other nations, who either submitted to the Romans or formed alliances with them, adopted many of the Roman customs and fashions. In *pl.* 18 are represented reliefs which exhibit sundry costumes, also coins, utensils, ornaments, &c. *Fig.* 1, Gallic matrons and their dresses; *fig.* 2, antique bas-relief from Marseilles; *fig.* 3, bas-relief from Narbonne; *fig.* 4, one from Metz; *figs.* 5 and 6, two from Langres and Paris respectively; *fig.* 7^{ab}, old Gothic coin; *fig.* 8^{ab}, Gallic coin stamped after Greek models; *figs.* 11 and 27, Gallic keys; *fig.* 12, fragment of a Gothic frontlet; *figs.* 13–16, coverings for the feet; *figs.* 17 and 18, lamps; *figs.* 19 and 20, candelabra; *fig.* 21, a chime of bells; *figs.* 22–26, table, chairs, and couch; *figs.* 28–30, table vessels; *figs.* 31 and 32, fork and spoon; *figs.* 33 and 34, ear-drops; *fig.* 35^{ab}, rings; *fig.* 36, necklace; *fig.* 37, seal; *figs.* 43–46, matrices or dies for coins and medals; *fig.* 61, Cussy column, *i. e.* an octangular pillar, surrounded by statues of the Roman gods. It stands on a meadow, near the French village of Cussy-la-Colonne, in the district of Beaune, department of Cote d'Or, and is, unquestionably, a specimen of old Roman art.

Without permission of the senate, no marriage but that of Roman citizens and matrons was lawful; and at first the intermarriage of patricians and plebeians was prohibited. Before the celebration of the nuptials, a solemn betrothal took place, at which the bridegroom placed a ring upon the finger of the bride, after the consent of the fathers had been given, and in presence of all the relations.

On the evening of the wedding, the bride was wrested with apparent

force from her mother's arms, and covered with a veil. She was then conducted by three boys with torches, and escorted by relatives and friends to the house of the bridegroom. Here she smeared the door-posts with grease to prevent evil enchantments, and was then lifted by the attendants over the threshold. She carried from home a distaff, with spindle and wool, and received on entering the keys of the house, fire, and water. Then followed the festive entertainment, accompanied with singing and dancing. Nuts were scattered among the people. On the next day followed a thank-offering, by the newly-espoused, to the Lares or Penates (household gods).

Divorces were at all times permitted on the part of the husband; but in the early ages, owing to the strict mode of living, seldom occurred. Under the emperors divorces frequently took place for the most frivolous reasons, on both sides.

The festivals of the Romans were partly celebrated by private families, partly by the whole people. The public games ranked among them; their primary and original importance lay in their religious significance, but by degrees they changed their character entirely. We notice some of the principal sports.

2. The *Ludi Circenses*. These are said to have been instituted by Romulus in honor of the god Consus, though they took their name from the *Circus Maximus*, built by Tarquinius Priscus, who ordered them to be celebrated in this place. The procession marched from the Capitol, through the market, to the Circus. The youth occupied the front, some on foot, others mounted; then followed the chariots; after these, the gladiators, cithara and flute-players, buffoons, jugglers, the band of music, and, finally, persons having charge of the sacrifice, bearing golden and silver vessels and the images of the gods, in splendid carriages or frames. Before the opening of the games, sacrifices were made by the magistrates and priests. The contests which followed consisted of races on horses and in chariots, gymnastic exercises in the style of the Greeks, various warlike performances on foot and horseback, and combats of beasts, in which the animals either fought alone, or with gladiators. These latter were either volunteers or condemned criminals. Finally, representations of naval battles took place.

The circus had room for 150,000 persons, or, according to others, 385,000. On the one side were the lists (*carceres*) with openings (*ostia*) from which the chariots received the signal to start. Through the middle extended a strong wall (*spina*). It was four feet high, and ornamented with statues and designs suited to the place. The course encompassed this wall, at each end of which arose three pyramidal pillars (*metæ*).

2. *Ludi Gladiatorii*, the games of the gladiators. These were originally held in honor of the distinguished dead, and took place at their obsequies. Afterwards they became public amusements, given on certain solemn occasions at the expense of the state or of individuals, in amphitheatres built for the purpose. The gladiators were generally slaves, prisoners, and criminals; but freemen, too, for money would take their place. Under the emperors these games reached a fearful eminence. During the

festivals ordered after Trajan's victory over the Dacians, and which lasted 123 days, 10,000 men and 11,000 animals were active combatants.

3. *Ludi scenici*, dramatic representations, first introduced by the Etruscan players, 364 B.C. More than one hundred years later, Livius Andronicus introduced the Greek drama.

Pl. 14 gives illustrations of the principal details of the Circensian games. *Fig.* 1, procession on horseback round the *spina*; *fig.* 2, racing on horseback; *fig.* 3, chariot races; *fig.* 4, ground plan of the Circus Neronis; *fig.* 5, elevation of the wing AA; *fig.* 6, elevation of the wing BB; *fig.* 7, elevation of the *spina* EE, adorned from *a* to *g*, with altars, statues, &c.; particularly, *a*, a temple with an obelisk; *b*, a temple with seven balls or eggs, dedicated to Castor and Pollux; *c*, pillar with a statue of victory; *i*, central obelisk of the *spina*, and answering the purpose of a dial; *fig.* 8, *metæ*, the pillars at the end of the circus; *fig.* 9, dial obelisk of the *spina* on a larger scale; *fig.* 10, statue of Mercury marking the commencement of the lists in the circus; *fig.* 11, a race chariot; *figs.* 12, 13, portions of the same; *fig.* 14, banner with a winged victory; *pl.* 15, *fig.* 1, gladiatorial combat with animals in the Coliseum in the reign of Domitian; *pl.* 13, *fig.* 2, contest of gladiators in the theatre.

The Romans, like the Greeks, regarded the burial of the dead as a religious ceremony, and the wealthy spared no cost in the splendor and pageantry of their interments. This went so far, that the law was finally compelled to interfere to regulate them.

Distinguished Romans were buried nearly as follows: After various ceremonies, the corpse was publicly exposed for several days. On the eighth day it was folded in the toga, or if the deceased had been a public character, in the official dress, and a small coin, as a fee to Charon, was placed in the mouth. Then followed a solemn funeral. In earlier times funerals took place at night, but the time was afterwards changed to the morning. At the head of the procession marched a band of music, and a number of women, hired as mourners. Then followed several players and mimics, who, concealed by carefully executed masks, represented the deceased and his ancestors. Next came persons carrying the portraits of the ancestors and the decorations of the deceased; and finally, the corpse upon an open bier, surrounded and carried by relatives and friends in mourning. In the Forum, through which the pageant passed, a funeral address was pronounced, after which the body was borne out of the city to be either burned or interred. In the first century before Christ, the former mode of disposing of the body was prevalent, but after the introduction of Christianity, ceased entirely. The coffin was not unfrequently made of stone. In case the body was burnt, the magnitude of the funeral pile varied, of course, with the wealth and position of the deceased. The pile consisted of odoriferous combustibles, or was sprinkled with incense after being lighted by the relatives, with their faces averted. Costly objects, especially the armor, clothing, and industrial implements of the deceased, were usually consumed with the body (*pl.* 13, *fig.* 4). In the meantime, the female mourners, joined by the bystanders, sang funeral songs. Occasionally, during

the burning of the corpse, or after it was consumed, gladiatorial combats were performed (*pl.* 13, *fig.* 3).

We have already spoken of the deification (apotheosis) of Romulus. After Julius Cæsar, the practice became frequent with the emperors. The person thus deified took the appellation *Divus*, or in the case of an empress, *Diva*, the family name was changed, and the new deity was represented with the attributes of glory, divinity, &c. During the burning of the body of a deified person, an eagle was caused to rise from the flames (*fig.* 4); on monuments is represented the divinity supported by an eagle, or if it is an empress, by a peacock. After the fire was extinguished, the relatives collected the ashes and bones, and had them solemnly deposited with costly spices in an urn (*pl.* 16, *figs.* 12–18^{ab}); *pl.* 17, *figs.* 8–10, Roman urns. For old Gallic funeral urns, see *pl.* 18, *figs.* 9, 10, 38, 39; and German urns, *figs.* 40–42. These urns were finally deposited in graves, vaults (*Sepulchra*, *Mausolea*, *Cenotaphia*, *Catacombæ*, &c.). Originally, the remains were interred either in the fields or near the dwelling of the deceased; but after the promulgation of the Twelve Tables, only Vestal Virgins, and such persons as obtained special permission, could be buried within the limits of the city. Interments were frequently made near the public roads, and celebrated men were buried in the Campus Martius or Campus Esquilinus. The wealthy had tombs on their own manors and estates; the poor people were buried in a field outside the Esquiline gate. *Pl.* 16, *fig.* 26, and *pl.* 17, *figs.* 5–7, sarcophagi; *pl.* 17, *figs.* 2–4, tombs; *pl.* 18, *figs.* 57, 58, Carthaginian monuments; *pl.* 17, *fig.* 1, the tomb street in Pompeii, taking its name from the beautifully finished tombs along its sides.

Italy had numerous catacombs, similar to those of Egypt, Asia Minor, Syria, Persia, &c. These subterranean structures were originally quarries, but were used in later times as places of burial. During the persecutions, these dismal caves served as places of worship for the Christians. A large number of martyrs are interred in the catacombs of Rome, to which the church of St. Sebastian forms the principal entrance. *Pl.* 19, *fig.* 11, ground plan of part of the Roman catacombs; *fig.* 2, those of Syracuse; *fig.* 3, those of Naples; *fig.* 4, longitudinal section of part of the latter; *fig.* 5, transverse section of another part of the same; *fig.* 6, the chapel seen in *fig.* 5, on a larger scale; *fig.* 7^a, plan of the catacombs of San Marcellino, near Rome; *fig.* 7^b, perspective view of some galleries in the same; *figs.* 8, 9, details of the same; *fig.* 10, view of one of its chapels; *figs.* 12, 13, the opened graves of the Christian martyrs; *fig.* 14, a sarcophagus from the catacombs; *fig.* 15, chapel and tomb of St. Hermes; *fig.* 16, chapel and oratory connected with the grave of St. Agnes; *fig.* 17, ground plan of the subterranean church of St. Hermes; *fig.* 18, elevation of the subterranean church of St. Prisca; *fig.* 19, tabernacle of the church of St. Nereus and St. Achilles, near the columns of Antoninus; and *fig.* 1, view of the apostles' grotto at Jerusalem.

St. Agnes, a beautiful young woman of Rome, was universally celebrated for sanctity and purity, and suffered martyrdom, 303 A.D. The 29th of January is sacred to her memory. St. Hermes or Hermas was one of the

Apostolic Fathers, mentioned in the Epistle to the Romans xvi. 14; according to others, he was a brother of the Roman bishop Pius, 140 A.D.; while still another class maintain that he was one of the seventy-three disciples, and bishop of Philippi and Philipopolis. St. Prisca, or Priscilla, is named in the Acts of the Apostles xviii. 2, 18, and 26, and Epist. Romans xvi. 3. St. Nereus (St. Neri) was a follower of St. Maria Domitilla, whom he accompanied with St. Achilles, in her exile to Pontus, where both suffered martyrdom through the agency of the proconsul Minutius Rufus, under the emperor Domitian. The day sacred to the memory of both is May 12th. It is supposed they were baptized by the Apostle Peter.

II. HISTORY OF THE MIDDLE AGES (395-1500 A.D.).

The history of the middle ages usually embraces the period between the fall of the West-Roman empire and the close of the fifteenth century. At the decline of the Roman empire in the west, Europe presented a scene of boundless confusion. Savage conquerors swarmed over the dismembered parts of the vast empire, and destroyed, with cruel hands, the admirable works of art, skill, and industry. Out of this chaos of barbarism new states were destined to arise, and give to order and civilization a new and lasting impetus.

Religion is the source of all human civilization, and on this element rests the history of the people of the middle ages. Three grand forms of religion prevailed: Christianity, Islamism, and the worship of the Grand Lama. These found their expression in three vast hierarchies, which, though differing in their respective constitutions, nevertheless furnished strong bonds of union for the scattered nations. The grand theatre for the movement of the middle ages is Europe and Asia.

At the commencement of this period, the Roman empire appears rent in two divisions: the eastern and western. Through internal and external causes, the former gradually declined, but the latter continued to exist for several centuries, although deprived of its earlier glory. Persia still asserted her power, threatening that of Rome, while from the north, in wild multitudes, poured down the Germans, Sarmatians, and Scythians. About the close of the fourth century, after the Visigoths and the Vandals had overrun the eastern wing of the empire, and the Huns had scattered their terrors over the plains of Italy, the Herulian Odoaker, and soon after the Ostrogoth Theodoric, appeared in Europe, and led on their armies to decided triumphs. All the provinces of Western Rome, by degrees, became subject to the conquering tribes. The Vandals possessed themselves of Africa; Spain fell into the hands of the Alans, Suevians, and Visigoths: the last, however, also took possession of Gallia; the Burgundians located along the banks of the Saone; and the Alemanni upon those of the Upper Rhine. The Franks obtained Northern and Eastern Gallia, while the Angli

and Saxons moved into Britain; the Rugii and Heruli seized upon Noricum and the adjoining districts, and the Ostrogoths took Italy and the Rhetian and Illyrian provinces. The eastern empire, too, was compelled helplessly to witness the spoliation of its European provinces, particularly those of the north. In passing to the west, the Gothic tribes had seized upon the rich and cultivated territories lying on the Danube and about Mount Hæmus, and soon after the Gepidæ, a cognate people, settled in Pannonia. Next to these came the terrible Huns, driving all before them, and moving unchecked as far as the Loire and the Po; and finally, the no less savage Bulgarians, Avari, &c.

These vast national incursions continued down to the beginning of the eighth century. The Slavonic and new Germanic tribes became the successors of the Asiatic invaders, and took up their abodes in the Roman, Germanic, and Sarmatian dominions. About this period were organized the realms of the Saxons, Frisii, Thuringians, and Bavarians. The Lombards secured the ascendancy in Upper Italy, while the Wendic, Slavonic, Turkish, and Tartar races, entered the regions lying between the Black and Baltic seas, and waged perpetual wars with each other. In this way many new kingdoms were founded, most of which soon again went to ruin, so that their very names were forgotten; others, again, lost their independence. Thus the vast and powerful kingdom of the Huns was entirely dissolved, soon after the death of their leader, Attila, 454 A.D. From the Palus Mæotis to the boundaries of Bavaria, the Calmuck and Tartar hordes enjoyed unmolested empire, while beyond them, towards the north, ruled Slavonic tribes. The Visigoths conquered the Suevi and Alans in Spain. The Vandals, who had crossed the Straits of Gibraltar, and settled in North Africa, were obliged to relinquish their homes, and thus the powerful state founded by Genseric was destroyed by the Roman commander, Belisarius, in the first part of the sixth century, and fell under Roman dominion. Not long after, under the immediate successors of the great Theodoric, the Ostrogothic empire tottered to its fall; and only a few years later, the Longobardi, who had already subverted the kingdom of the Gepidæ and Heruli, wrested Upper Italy from the Byzantines; but in their turn, were at last obliged to submit to the victorious Franks, 774 A.D.

Clodowig, or Clovis, founded the monarchy of the Franks, 496 A.D. The empire rose rapidly. Having crushed the few remains of Roman dominion, Clovis next subdued the Alemanni, and expelled the Visigoths from Southern Gallia. He afterwards reduced to a condition of dependence, the Burgundians, Thuringians, Frisii, Bavarians, and a considerable division of the Saxons, and thus laid in the heart of Europe the foundation of a new and splendid political power, which attained the summit of its strength in the reign of Charlemagne (768-814).

Various fortunate circumstances combined to enable Constantinople to turn aside the streams of the barbarian migrations. Under Justinian the Great, appeared for a while to be regained, through Belisarius and Narses, some of the former Roman glory at arms. But the old causes of decline: the despotism, profligacy, and mental imbecility of the emperors, and the

ambitious intrigues of the priesthood and the army, shook the empire to its foundation. Had not external circumstances been favorable, the Byzantine throne had crumbled to dust much sooner than it did. In Asia it only retained Asia Minor and the Syrian coast, and Persia formed its eastern boundary. The last great prince of the Persian empire was Chosroes Parvis. He reigned from 591–628 A.D., and was assassinated through the instrumentality of his son Shirves; whose successor fell with the whole empire, under the power of the Arabian Caliph Omar, 634 A.D.

Arabia, invincible on account of its deserts, and consequently having never yet fallen under any conqueror, now became an empire of importance in the world. It soon extended over three parts of the globe, and there sprang up a religion which even at present is far spread in the east.

Mahomed, son of Abdallah, was the founder both of the empire and of the religion. He was born at Mecca, 569 or 571 A.D., and his religion bears his name. He died 632 A.D. A hardy people like the Arabians, full of religious enthusiasm, and believing in fatalism, could hardly meet any effectual resistance.

Asia Minor was conquered by Osman, whose reign lasted from 644–656 A.D. He created a naval force, subdued Cyprus, Rhodes, and Creta, and at length even threatened Constantinople. Later, the Arabians established their government over India, Samarcand, and Northern Africa. Carthage yielded, 689 A.D.; and crossing the straits to Spain, 711 A.D., the Mahomedans vanquished the Visigoths at Xeres de la Frontera, subdued Sevilla, and erected in the city of Cordova a separate Caliphate. It was their plan to return to Arabia through France, Germany, and Hungary, by way of Constantinople, and to win these countries to Islamism; but they were prevented by the successful interposition of Charles Martel, 732 A.D. They also secured strong positions in Sicily and Lower Italy. Under Caliph Al-Walid, 705–715 A.D., the Mahomedan power rose to the height of its grandeur and extent. But violent internal quarrels in regard to the regal succession distracted the empire. The family of the Abassides at length gained the supremacy. They were greatly distinguished for the promotion of science and art. Among its members ranked high Al-Mansin, who made the newly-built city of Bagdad his residence; Harun-al-Rashid, the great contemporary of Charlemagne, who died 806 A.D.; and Al-Mamum, who died 832 A.D.

The Chinese empire exhibited no signs of progress or development. Of immense extent, and well stocked with schools, scholars, and bonzes (priests), it seems, nevertheless, to have stood still on a certain step of civilization, while all its neighbors were in a phase of rapid development and reorganization. It will not claim our attention till at a later period.

We here close the first division of this period, and propose, before entering on the second, to append some special notices about several tribes alluded to in this outline.

1. THE GOTHs.

The Goths (Gode-men) are a German nation, and it is supposed that they originally resided far north in the Scandinavian peninsula. Inclosed by the sea on two sides, they early became mariners. They abandoned their rude homes, and setting out upon frail vessels under King Verig, they located in European Sarmatia. Historians represent them as early as 320 B.C. living at the mouth of the Vistula. We see them about the end of the second century of the Christian era uniting with other German tribes, and breaking beyond their boundaries in vast numbers. In the third century they appeared in Dacia, and penetrating in an eastern direction, seized the best portions of coast along the Black and Caspian seas. They made continual incursions into the Roman provinces, and carried on numerous and successful piratical expeditions. While residing in the south-east of Europe, they separated into two grand political divisions, ruled by special royal families: the Ostrogoths, who occupied the coasts of Pontus; and the Visigoths, who settled in Dacia. Their subsequent history has already been given. (*Pl.* 20, *fig.* 1, a Goth.)

2. THE SUEVI.

Some writers attribute the derivation of the name Suevi to a custom of wearing the hair tied at the top of the head, though it seems more natural to deduce it from their principal river, Suevus (Oder). Suevi is a comprehensive appellation for all the tribes living between the Vistula, Upper Elbe, and Danube, the principal of whom were the Semnones, Quadi, Marcomanni, Goths, &c., who were members of the powerful alliance mentioned as the Suevian Union. Cæsar gives the earliest account of them. He says that their state was divided into one hundred counties, every one of which annually furnished 1000 armed men for war purposes. Those who remained at home cultivated the soil for their own support and that of the army; and every year the husbandmen and the warriors exchanged employments. None had private landed property, and the residences were changed yearly; for that reason they are not likely to have had cities.

Irritated by some incursions of the Romans into Pannonia and Noricum, the Suevi crossed the Danube, under their leader Marbodius, and seized upon the adjacent countries. From that period the name Suevi has been applied only to the southern branch of the alliance, though, in the fourth century, these tribes were called by their different names, while only the Germans who settled in the modern Suabia were known by the name of Suevi, which henceforth became the appellation of one people. (*Pl.* 20, *fig.* 2, a Suevian.)

3. THE GEPIDÆ.

These were clearly a branch of the old Gothic stock. Their name (Gepidæ: lazy, slothful) originated, it is believed, from the sluggish movement of the awkward ships in which they emigrated from Scandinavia into Germany.

After settling near the mouth of the Vistula they became so numerous and powerful that, 254 A.D., they moved out under their king Fastida, and conquered the Burgundians. Very soon after this they met a mortifying defeat from the Ostrogoths. Subdued by the hordes of Attila, they finally settled, 454 A.D., in Dacia, where they founded a kingdom, concluded a friendly alliance with the Romans, and assisted the Ostrogoths against the Suevi, but strove to prevent the passage of King Theodoric into Italy, 489 A.D., although their attempt was unsuccessful.

In the reign of Justinian they began to extend their dominion, but he applied to the Longobardi for assistance against them; and in the war which ensued they were obliged to encounter the united forces of the Longobardi, Avonians, and Romans. They fell, in the unequal contest, under the power of Alboin, king of the Lombards, and became incorporated with the Lombardi, 565 A.D. (*Pl.* 20, *fig.* 3, a Gepide.)

4. THE VANDALS.

The Vandals were a cognate race with the Goths, dwelling in the mountainous regions of Lusatia. They possessed a fine physical formation, having slender figures, fair complexion, yellow hair, and a frank open countenance. Near the end of the second century they concluded a treaty of alliance with the Romans under the emperor Commodus, and also with the Quadi and Marcomanni. Later, they waged war with the emperor Aurelian, but were unsuccessful, when, uniting with the Burgundians, 280 A.D., against the emperor Probus, they renewed hostilities on the frontiers of Gallia with no better fortune, part of them being laid low, and the remainder either persecuted or sent to Britain with the legions as agriculturists.

From this point we lose sight of the West Vandals, while their eastern brethren gained a considerable celebrity. They had early settled in Transylvania, which they continued to hold and govern until the Goths expelled them, when they were kindly received by the emperor Constantinus, who located them in Pannonia. During the great national migrations the peaceful Vandals, together with some hordes of the Alani, were pushed on into Gaul, 406 A.D. On their march they received numerous accessions from the Suevi. Strengthened by these forces, they attacked and devastated Strasburg, Worms, Mayence, and various other cities, and then marched through the entire country of Gallia. After a brief sojourn here they passed into Spain, by the Pyrenees, 409 A.D. There they

settled, in the western and south-eastern parts of the country. Again disturbed by the restless Goths, they joined Genseric, who, with his Alani, was conducting an expedition against Africa, 429 A.D. In ten years they conquered the whole northern coast, from Tangiers to Tripoli, and made Carthage the capital of the new empire. Genseric was victorious in all his expeditions, and did not stop in his career until he had even conquered Rome itself, 455 A.D., which for ten days was plundered by his horde. When he died, 477 A.D., the Vandalic kingdom fell into fragments. The rest of the nation was either merged in the African provinces, or sent as Greek soldiers to the Persian frontier. (*Pl.* 20, *fig.* 4, a Vandal.)

5. THE MARCOMANNI.

The Marcomanni (mark-men, inhabitants of the frontier) originally lived in the southern part of Germany, and probably in what is now known as Moravia, though, according to some authors, they resided between the Main and the Neckar. This much, however, is certain, that they removed, under Marbodius, into Bohemia, where they formed an alliance against the Romans, at the head of which they were, until at length the Cherusci superseded them in the command. They retained much of their former vigor, but remained quiet towards the Romans until the time of Domitian, who attempted to subjugate them and the Quadi. He lost an important battle with their united forces. After various incursions in Pannonia, the two nations were mastered by Nerva and Trajan. They strengthened themselves, however, for another conflict by alliances with the other German tribes. Thus prepared, they made a descent upon the Roman empire, and carried on the bitter war, in the reign of Marcus Aurelius, known as the war of the Marcomanni, 166–180 A.D. Commodus, 180 A.D., concluded with them a peace, to secure which they had to give hostages to the Romans; moreover, they were made to pay a heavy tribute of grain, restore all the prisoners (100,000 men), and even furnish auxiliary troops to the Roman legions. Nevertheless, they continued to make one incursion after another into the Roman empire, until the fifth century, when they gradually disappeared, part of them being swept along with the vast migrations of the times, and the rest merging with the Bavarians. (*Pl.* 20, *fig.* 5, a Marcomann.)

6. THE QUADI.

These people always appear in connexion with the Marcomanni, together with whom they had taken possession of the territories of the Bavarii, after expelling these. The constitutions of both people were alike, the throne being hereditary; and both proved equally formidable and oppressive to their neighbors. The Quadi disappeared from the list of

nations in the fifth century, being most probably borne into Spain along with the general current of emigration.

The original residence of the Quadi seems to have been modern Bohemia, Moravia, and Austria Proper, and they were bounded east by the territory of the Jazyges, south by the Danube, north by the Carpathian and the Sudeti mountains, and west by the Marcomanni.

At a later period appeared another tribe bearing the name of Quadi, and formed most probably of some of the different Suevian tribes. They obtained from the Romans the strip of land lying between the rivers Marus and Cusus, in Upper Hungary, and were governed by Vannius, a king descended from the older Quadi. (*Pl. 20, fig. 6, a Quade.*)

7. THE HERULI.

The Heruli were a German tribe, inhabiting Scandinavia. The Danes subsequently dispossessed them of that region, when they removed to those districts on the Baltic lying near the mouth of the Vistula. About the time of the emperor Galienus they again abandoned their homes, and settled on the coast of the Black Sea, when, uniting with the Goths, they lived as pirates.

Some of the better chieftains attached themselves to the service of the Romans, and constituted a special division of horse. Another company undertook an invasion of Gallia, but were totally defeated by the legions of Maximilian. Near the middle of the fourth century the Heruli were much crippled by the heroic Ermanarich, king of the Ostrogoths, but after the fall of the Gothic empire they again rose to some eminence. In the time of the emperor Anastasius they entered the Roman domains, and settled in Illyricum. Justinian granted them annually a fixed sum of money from the treasury, and rented lands to them in Servia, for which they agreed to assist him in all his wars against the Vandals, Goths, and Persians. At this period they adopted the Christian faith. Their system of religion, while heathens, differed materially from that of other German tribes. Thus it was considered the duty of the aged and incurably diseased to request their relatives to put them to death. The death-blow was given by a stranger. If a Herulian died a natural death, his widow was compelled to strangle herself at the grave of her husband. (*Pl. 20, fig. 7, a Herulian.*)

8. THE BRITONS.

The inhabitants of Britain were a mixture of Cimri, Gaels, and Iberians. At the period of Cæsar's invasion the Cimri occupied the southern districts, and had pushed the Gaels further north. They were in their turn compelled by the Anglo-Saxons, under Hengist and Horsa (449 A.D.), to emigrate to Bretagne, where they are still found. The inhabitants of modern Wales are also their descendants.

The ancient Britons fought mainly on foot, but also on a species of chariot which the Romans called *essedæ*. They combined in small clans, governed by chiefs, similarly to the modern Highland clan. They lived chiefly on flesh, and agriculture formed the occupation of none but the inhabitants of the coast. They dressed in skins, and their towns were nothing but large inclosures in the forest. Their language was a Celtic dialect. (*Pl.* 20, *fig.* 8, a Briton.)

9. THE FRANKS.

As early as the third century the Franks (frank, free people) arose out of the old Cheruscan confederacy. Under the emperor Maximinus, they occupied the territory lying west of the Rhine, as far as the Bohemian mountains, in the parts of Germany later known as Thuringia, Hesse, and Franconia.

From 237 to 244 A.D., during the reign of Gordian, and later, at the time of Probus, they began to be formidable to the Romans. Probus, in the year 278 A.D., completely routed their forces, and sent vast numbers of the prisoners to Pontus; but they escaped by sea, and returned to their native land. The rest he colonized among the Treviri and Nævii. The emperor Constantinus wrested from them their possessions in Batavia (Netherlands), 293–306 A.D., when they commenced a crusade upon Gallia, and were not conquered until the time of Justinian, 357 A.D. This emperor effectually humbled them.

The Franks at that period lived under several chiefs and kings, of whom Merowig and Chilperic gave great celebrity and influence to the Salique house. Chlodwig (Clovis), the son of Chilperic, established the dominion of the Franks over all Gallia, and became the founder of the great empire of France, to which part of the German Franks continued subject. *Pl.* 20, *fig.* 9, Franks in camp; *pl.* 21, *fig.* 1, Queen Clotilda, the beautiful consort of Clovis, in her royal dress. She was a princess of Burgundy, and had adopted the Christian religion, to which she also won her husband. *Fig.* 2, a maid of honor; *fig.* 4^{ab}, Frank warriors in the time of Clovis, and *fig.* 5, king of the Franks in his regal attire; *pl.* 22, *figs.* 1 and 2, statues of Clovis and Clotilda; *fig.* 5, Fredegonda, mistress of Chilperic, the father of Clovis. She was born 543 A.D., at Montdidiers, of mean parentage. *Fig.* 3 represents her tomb in Mosaic work; *fig.* 4, bas-relief on the tomb of the Frank king, Childebert.

10. THE HUNS.

The Huns inhabited the territories around the Caspian Sea. In the fourth century they commenced their conquests, and gained a name in history. In person the Huns were short. They had broad shoulders, prominent cheek-bones, flat noses, and deeply-sunk eyes. By cutting

and mangling the faces, they prevented the growth of the beard. They seemed to live on horseback, eating and sleeping, even keeping council without dismounting, so that they were very poor pedestrians. Their horses were ugly, but strong, quick, and well trained. Roots and flesh constituted their nourishment; they ate their meat raw, having first made it tender by carrying it some hours between the saddle and the back of their horses. They had no houses, nor even huts, and their women and children lived in wagons; here the children were born and reared. Their weapons consisted of darts, slings, spears, and sabres. In war they aimed chiefly at dismounting and plundering the enemy, and observed no distinct order of battle.

Various theories are given of the origin of the Huns. It is most likely that they sprang from Upper Asia, and were of Mongolian descent. This view is confirmed by the historical fact, that about a century previous to their appearance in Europe, the Hiong-Nus, or Mongols, were attacked by the Chinese. Their empire was dissolved, and the inhabitants are supposed to have roamed about the Steppes of Tartary. Tradition even ascribes to them the foundation of a kingdom between the Jaik and the Obi rivers. We may add, that in many of their habits the Huns bore a strong resemblance to the olden Mongols, who are supposed to have been driven from their possessions on the river Obi, about 318 A.D., and to have settled near the Caspian Sea. The leading features of the migrations of the Huns have already been given. (*Pl. 20, fig. 10, a Hun.*)

11. THE CALEDONIANS (PICTS).

The Caledonians were the inhabitants of the northern part of the island Albion, now Scotland. They came from the Celto-Gælic stock, and were probably the first inhabitants of the large island. Retreating before the Belgic or Cambrian forces, they abandoned the south for the northern districts; at the arrival of the Romans they retired to the northern Highlands, and large companies of them crossed to and settled in Hibernia (Ireland). The Romans gave them the name of Picts (*Picti*), from their custom of painting, but they also called them Scots. During all the time of their sway in Britain the Scots kept up continual wars with the Romans, who sought to limit their incursions by erecting high walls, remains of which still exist. The Romans gave the name of Britannia Barbara, or Ulterior, to that part of the island which they failed to subjugate; Caledonia, also, was a term applied to the northern regions.

The Gaelic dialect was spoken by the ancient Caledonians; and their modern descendants, the Highlanders of Scotland and the Irish, still retain the ancient language. The people lived in feudal communities or clans, all of which had a common chieftain, and later, a king. The

Caledonians adopted Christianity in the sixth century. (*Pl.* 20, *figs.* 11–14, Caledonians or Picts.)

12. THE ANGLO-SAXONS.

Tacitus designates the Angli as a Suevian tribe who lived on the Elbe. Combining at an early period with a branch of the Saxons and Jutes, they crossed over into Britain during the latter part of the fifth century. At first they were auxiliaries to the inhabitants, but afterwards their conquerors and oppressors. At the close of a conflict extending through 130 years they found themselves masters of the whole island.

Of these three nations the Saxons were the most influential. They were called Anglo-Saxons to distinguish them from the Saxons who still remained on the continent; and after the sixth century the country took the name of Anglia, which was subsequently changed to England. The ancient inhabitants are represented as rude and warlike. Prior to their invasion of Britain they had scoured the seas as pirates. They erected by degrees seven principalities, known as the Heptarchy. These were united into one kingdom by King Egbert. (*Pl.* 20, *figs.* 16–18, various Anglo-Saxons; *fig.* 15, Anglo-Saxon chieftain.)

13. THE DANES.

Denmark is considered the residence of the ancient Cimbri. In the year 113 B.C., this people emerged from the northern plains, pouring by hundreds of thousands, including their wives and children, into the Roman provinces. Their progress, at first almost irresistible, was at length arrested by Catulus and Marius, 101 B.C., who completely routed them in the plains near Verona. Somewhat later the triumphant Odin, advancing with his Gothic warriors from the south-east, overran Denmark, and gave a new religion to the inhabitants. Between his arrival and the period of Harald III., several kings, or rather princes, ruled over the lawless piratical tribes. One of these kings, Skiold, obtained no mean historical celebrity. Charlemagne waged a vigorous war with Gothric, king of Schleswic and Jutland. At the close of the contest the river Eyder was recognised as the boundary of the Carolingian dominions, 810 A.D. (*Pl.* 20, *figs.* 21–23, Danish citizens; *fig.* 19, a king of Denmark; *fig.* 20, a Danish warrior.)

We now pass on to the

SECOND PERIOD OF MEDIEVAL HISTORY,

extending from the reign of Charles the Great (Charlemagne) to the commencement of the Crusades, 768–1096 A.D.

Charles the Great stands forth pre-eminent in this period. He was the son of Pepin and Bertha, and was born 742 A.D. Nature had endowed him richly, both as to physical and intellectual gifts, which he developed by early exercise. With a quick glance he surveyed all, was great in word and action, yet not faultless.

At the death of his father he inherited the north, from the limits of the Slavonic territories to the Garonne, while his brother Carloman obtained Alemannia, Alsacia, Burgundy, and all the southern parts of France, as far as the Pyrenees. The first occasion for the exercise of Charles's warlike genius was furnished by the rebellion of the Aquitanians, under the old Hunalde, who had formed a secret alliance with the Spanish Arabians. He soon quelled the insurrection, but this war involved him in a quarrel with his brother, who had refused his aid in the struggle. Before this quarrel could lead to civil war between the brothers, Carloman died suddenly, and Charles, regardless of the claims of his nephews, induced the chief men of his brother's realm to proclaim himself king. Charles thus assumed the sole government of the whole empire, 771 A.D.

This empire, founded by force of arms, could only be maintained and extended by the same means, being entirely surrounded by savage and warlike tribes, who frequently invaded the frontiers, spreading death and destruction wherever they went.

At this period Desiderius was king in Pavia, the capital of the Longobardic empire. He had given his daughter in marriage to Charlemagne, who, however, became enraged with his father-in-law for offering refuge to his exiled nephews, the sons of Carloman, and sent his wife back to her father. Desiderius felt this insult keenly, but not daring to take open steps against Charlemagne, he tried to raise a party in favor of the sons of Carloman, and applied to Pope Hadrian to anoint them as kings of France. The pope refusing, Desiderius turned his forces against him, invading the territories which the pope had received from Pepin. The holy father sought protection from Charles. The latter proposed a compromise, which being refused by the proud king of Lombardy, induced Charles to declare war and to besiege Pavia. The city maintained an obstinate resistance for ten months, but hunger and pestilence finally compelled the Lombards to surrender. Desiderius was taken prisoner, and after being deprived of his sight, was consigned for the remainder of his life to a monastery. Charles was crowned king of Lombardy 774 A.D. Adelgi, son of Desiderius, tried to oppose him, but was defeated. The Duke Friaul, who would not submit quietly to the authority of Charles, was punished like a common felon, and even the powerful duke of Benevento was compelled to acknowledge the Franconian supremacy.

The quarrel with the Saxons had commenced previous to this time, and continued for more than thirty years (772-803). Charles opened the war by capturing Cresburg, and enraged the Saxons by destroying the column of Irmin, which was venerated by them. He then penetrated as far as the Weser; but however successfully he fought, the Saxons, having only yielded to superior numbers, always rallied and attacked their oppressors

with great fury. Charles at length became convinced of the impracticability of their permanent subjugation, and finally consented to leave them their own freedom and laws, in hopes thus to secure to himself their allegiance, and to induce them to adopt the Christian religion. A great number of the Saxons received the rite of baptism, and recognised Charles as their liege lord, 777 A.D.

This submission, however, was not universal. Wittekind, a noble Westphalian, and a glorious leader of the Saxons, did not yield, but fled to the king of Denmark. Among the subdued Saxons rebellion broke out twice, and was quelled by Charles, who, exasperated at their unruliness, put 4,500 of his prisoners to death in one day, at Verdin, on the Aller, and devastated all the territory up to the banks of the Elbe. The gallant Wittekind, who was again at the head of his party, touched with the sad fortunes of his compatriots, at length began to relent in his hostility to the Franks. At the same time distrust arose in his mind in regard to the power of his own gods. Despairing of final success, he listened to the oft repeated proposals of his great enemy, professed his belief in Christ, and was baptized at Attigny in France, 804 A.D., Charles standing as his godfather. Charles felt satisfied that by Wittekind's conversion the only obstacle to a lasting peace with the Saxons was removed. Wittekind remained faithful to the Christian cause, and became zealous for its promotion. Vast numbers of his countrymen followed his example, and submitted to the ceremony of baptism; and under the benign influences of the new religion the fair fields of Saxony once more yielded the means of wealth and happiness.

Charles had convened a council or diet at Paderborn, in 777 A.D., at which appeared, among others, delegates from two Spanish emirs, in order to implore his protection against their oppressor, the Caliph Abderrhaman. With the hope of planting the cross firmly in Mahomedan Spain, Charles complied with their solicitations, proceeded in the year 778 with a powerful force across the Pyrenees, and in a short time captured Pampeluna and Saragossa, and conquered the whole country to the Ebro, which, under the title of the Spanish Mark, was joined to his dominions. But on his homeward march he was furiously attacked by the mountaineers, and sustained great losses; and it was in this engagement the noble Roland fell, who is so heroically and beautifully sung by Ariosto.

Not long after the conclusion of peace in Saxony, new troubles arose by the rebellion of Tassilo, duke of Bavaria, and son-in-law of Desiderius, king of Lombardy. Charles suppressed the insurrection (788); but the treachery of Tassilo, who soon after induced the Hungarian Avari to march into Franconia, did not permit him to remain long quiet. Irritated by this conduct, Charles had him arrested at Ingelheim, and he was imprisoned in a convent. In retaliation upon the Avari, Charles conquered their territory and annexed it to his kingdom under the title of the East Mark, 799 A.D.

Pope Leo III., the successor of Hadrian, being furiously attacked by his enemies, sought the assistance of Charles. The latter repaired at once to

Rome, restored general order, and, at the request of Leo, pardoned the leaders of the rebellion. In gratitude for his timely aid, Leo crowned him as Roman emperor, at which the crowd testified their delight by loud rejoicings. Thus was renewed the title of Roman Emperor, after a lapse of 324 years.

Hitherto Charles had done much for the extension of Christianity. He now also took care of the internal administration of the church, encouraged talent in preaching, reformed the church music, founded bishoprics and schools, aided in the improvement of the German language, and himself learned to write at the age of fifty-eight. Nor was he blind to the temporal interests of his kingdom. He sent officers of inspection into his provinces that were governed by counts, he protected commerce as the means of uniting the nations and encouraging civilization. Soon after his return from Italy he had the happiness to see all his differences with the Saxons finally adjusted by the peace of Selz, on the Saale, 803 A.D. He was, however, still troubled by his belligerent neighbors, the Wilsii, in the east, and the Normans in the north. Charles first set out against the Wilsii, a branch of the Slavonic tribe, defeated them, and built a castle on the Saale (modern Halle), and another (now known as Magdeburg) on the Elbe. These fortifications were destined for the overawing of these enemies. The Normans in Denmark succumbed to the arms of Charles, and their king, Henning, was compelled to acknowledge the Eyder as the boundary between his kingdom and that of the Franks. Charles's empire was now extended from the Tiber to the Eyder, from the Ebro in Spain to the shores of the North Sea, and from the Atlantic Ocean to the Elbe in Germany, and the Raab in Hungary.

Near the close of his reign he lost two of his sons; his surviving son, Louis, in anticipation of his own approaching demise, he caused to be crowned at Aix-la-Chapelle. He died a few months after, 814 A.D., in the seventy-second year of his active life. Arrayed in full imperial costume, with his crown and sword, a gilded copy of the Gospel on his knees, and a piece of the Holy Cross over his head, seated in a golden chair, with a pilgrim's pouch upon his thighs, he was placed in his tomb in the Chapel of St. Mary, at Aix-la-Chapelle.

Pl. 21, *fig.* 6, the Emperor Charlemagne in his imperial dress; *figs.* 7 and 8, prince and princess of Charlemagne's house; *figs.* 9 and 10, a noble of that period and his wife; *fig.* 11, a commander under Charles, with the imperial standard; *fig.* 12^a and 12^b, Austrian and Aquitanian warriors under Charles; *fig.* 13, one of Charles's bishops; and *fig.* 14, people in humble life; *pl.* 22, *figs.* 5 and 6, statues of women in the eighth century; *fig.* 7, mosaic figure of Charlemagne; *fig.* 8, Charles receiving the submission of Wittekind; *fig.* 38, Wittekind's statue.

From his kind disposition and peaceful virtues, Louis, who now ascended the throne, obtained the surname of the Meek (*Debonnaire*); but with the crown he inherited scarcely any of his father's qualities and energies. In the fourth year of his reign he united his eldest son Lothaire with himself as co-regent. The latter was destined to become the principal heir of the

empire, having the supreme command over his two brothers, Pepin and Louis, while the father divided his lands among them all three. This arrangement only served to create jealousy between the brothers. Civil war for a while seemed inevitable, when a new train of circumstances united all the brothers against their father.

At the death of the empress Irmingarde, Louis married Judith, a Bavarian princess, who, in 823, bore him a fourth son, Charles the Bald. The father wished also to bestow a kingdom on this new descendant, and therefore undertook a new division. The elder sons were not disposed to lose anything; they raised the nation against their father, attacked him with an army from three sides, and made him a prisoner, 830. By the sympathy of several German princes, and the want of harmony between the brothers, Louis was permitted to retain his crown. His sons seemingly humbled themselves, but they soon again revolted. Louis was a second time made prisoner by his sons, deprived of his authority, and, to complete his degradation in the eyes of his subjects, compelled to perform a solemn ecclesiastical penance. Much as this humiliating spectacle delighted Lothaire, the other sons declared in favor of the father, and in 835 restored the crown to him. Despite his bitter experience, he re-confirmed the partition of the empire, and after the death of Pepin, still continued to bestow his fondest favors on his son Charles, and even to show his preference for Lothaire, whereby he prompted Louis to make a third rebellion against his father, who in consequence died of a broken heart in 840.

On the decease of Louis, Lothaire, now emperor, regarded himself as the exclusive heir of the whole empire. But his younger brothers, with their nephew Pepin, raised an army against him, and met him at Fontenay, near Auxerre, 841 A.D. Lothaire lost the battle and fled, leaving 100,000 Franks dead upon the field. He now claimed the aid of the Saxons, but his second battle at Strasburg was not more successful than the first; and the Saxon warriors were severely punished by Louis (the German). Lothaire at length proposed terms of peace. A truce was concluded at Verdun, 843, by which the empire was apportioned into three great divisions, France, Italy, and Germany. Lothaire retained the title of emperor, and received Italy and the long range of territory along the Rhone, Saone, Meuse, and Scheldt, to the Rhine. Mayence, Worms, and Speier, with the countries east of the Rhine, fell to Louis, the German; while Charles the Bald received those countries lying west of the river already mentioned, to the ocean, or France Proper. Pepin and Charles, nephews of the three kings, were satisfied with Aquitania; but even of this district they were soon deprived by Charles the Bald. It does not appear that in this arrangement any permanent separation of the family or empire was contemplated. The Carolingian inheritance was, on the contrary, considered as a mutual claim; and so also was the *Arrière-ban*. Thus it will be seen that the idea of one entire empire, with one regent, existed still, and it seemed left entirely to circumstances to determine whether the empire was completely divided, or might yet be consolidated under some future monarch. Destiny, however, decided upon a perpetual division.

After the treaty of Verdun, the family of Charles the Bald, known by the name of the Carolingians, occupied the French throne down to the close of the tenth century. If we may judge from the surnames given to the monarchs, as the Stammerer, the Simple, the Lazy, &c., the line does not appear to have been remarkable for its virtues. Most of them met violent deaths, and under their weak administration it excites no wonder that the Normans attacked the country. This powerful and extensive people inhabited at that time the coasts of Denmark, Sweden, and Norway. They devoted the trees of their noble forests to the construction of ships, and as the Huns are reported to have lived almost entirely on horseback, so these hardy Northmen seemed contented only in their vessels, and their immense fleets were met on every sea. They passed up the rivers to the inland country, overwhelmed by their numbers the defenceless towns and hamlets, and plundered and destroyed without restriction. They were a savage race whom no sufferings daunted, and to whom death itself was only the glorious road to the palaces of the gods. They agreed to a peace with France, the conditions of which assigned to them the province of Normandy. They pursued their predatory incursions in Italy, England, and Germany, but by mingling with the inhabitants, or settling down in small communities, they at last lost their nationality, and disappeared as a distinct tribe from history.

Pl. 21, *figs.* 22 and 23, king and queen of the Normans; *fig.* 24, a Norman dame; *figs.* 25 and 26, Norman nobles; *fig.* 27, Norman citizen; and *fig.* 28, Norman laborers.

The French kingdom suffered not less from internal troubles than from the depredations of the Normans. The nobility of the empire availed themselves of the weakness of their king, and appropriated to themselves his power and rights. Every count and duke had his own court, and heedless of the orders of his king, he relied on his own strength. To appease the rapacity of these turbulent vassals, the government resorted to the policy of allowing them great privileges and making them considerable donations; and thus the royal domains gradually dwindled away, until, in the time of Louis V., the last of the Carolingian house, they embraced only Laon and Rheims.

At the death of Louis V., in 987, the wealthy and popular Hugh Capet, Count of Paris, took possession of the throne. Under him and his successors the power of the arrogant nobles was gradually broken, and one fief after another restored to the crown. The family of Capet existed until modern times.

Pl. 21, *fig.* 15, Louis V. in his tunic; *fig.* 16, the queen in full costume; *figs.* 17 and 18, princesses in domestic and state dresses; *fig.* 19, a prebendary; *fig.* 20, a nun; *fig.* 21, citizens.

In Germany the descendants of Charlemagne reigned only until 911, and in general the princes were little superior to their relatives in France. By the treaty of Verdun, 843 A.D., Germany fell to Louis, who soon found himself embarrassed by a jealous and powerful nobility, the Normans, and his own rebellious children. All the states of Charlemagne were added to

the empire under his successor, Charles the Stout; but, in consequence of a disgraceful peace with the Normans, he was deposed by his nobles, 887. He was succeeded by his nephew Arnulph, duke of Carinthia. Arnulph was a brave and energetic prince, and under his administration the Normans and other enemies of Germany were kept at a distance.

In Italy, more than in any other portion of the Carolingian empire, party strife prevailed. At the time of Arnulph two competitors appeared for the throne, Guido, duke of Spoleto, and Berengar, duke of Friuli. Guido was victorious, and received the imperial crown from Pope Stephen V. His son Lambert followed him. The aid of Arnulph was now sought by the rival faction. Arnulph crossed the Alps in 894, carved with his sword a path through Italy, carried Rome itself by storm, and obtained the imperial purple in 896. But he had scarcely evacuated Italy, before the Romans, to whom a foreigner was highly odious, again proclaimed Lambert emperor. The latter died in 898, whereupon a long continued strife began between King Louis of Lower Burgundy, and Berengar, duke of Friuli, and their successors, until the accession of Otto the Great.

Arnulph died in the year 900. His son, Louis the Child, still in his infancy, succeeded him. During his reign, the Hungarians invaded the country, and desolated it terribly. He died prematurely in 911, and was the last of his house.

The various German nations, the Saxons, Thuringians, Lorrains, Suabians, Frieslanders, Bavarians, and Franks, now proceeded to choose a king of their own, thus constituting Germany an elective monarchy. But in Germany the great and the people have never agreed very well, especially in the choice of a king. At the very first election Franconia and Saxony only chose the Franconian duke, Conrad, 911, after the refusal of the crown by Duke Otto of Saxony.

Conrad could neither avert internal commotions nor suppress external aggressions. The inhabitants of Lorraine, dissatisfied with his election, annexed themselves to France. This movement originated tedious and wasting wars between Germany and France. Conrad was obliged, at the same time, to contend with refractory and powerful vassals, especially with Henry, duke of Saxony, and son of Otto. The Hungarians also resumed their aggressions upon the empire. In the midst of these annoyances Conrad died, 918 A.D.

Anticipating his decease, and desirous of promoting the welfare of the country, he had himself nominated to the succession his old enemy, Duke Henry of Saxony, who was duly elected. When his brother Eberard brought to him the regal jewels, he found him at his fowling-floor, whence his surname the Fowler. He succeeded in pacifying the princes of the empire, in defeating the Slavonians on several occasions, and in conquering the Hungarians completely in 933.

Henry was essentially German in character; he was simple and bland in his manners, modest while enjoying good fortune, and not easily disheartened in bad. Though ordinarily mild and easy, he exhibited unyielding firmness in trying circumstances. He revered religion

without subjecting himself to the clergy. He was, in short, a most excellent prince. He died in the year 936.

His son, Otto I., succeeded him, and ruled until 973. He too had to war against the Hungarians, and was successful. Nearly one half of his reign was disturbed by civil wars. Eberard, brother of Conrad I., and other Franconian princes, Gisibert, duke of Lorraine, and the son of Arnulph the Wicked, of Bavaria, conspired repeatedly against his government. His own brothers, also, and even his son Ludolf, and his son-in-law Conrad, rebelled. Yet his energy, skill, and good fortune, finally overcame all these conspiracies. He was equally victorious in his contests with the Wends, Danes, and French. But his most brilliant and important achievements were in Italy. Berengar II., having wrested from Lothaire, the son of Hugh, one half of that kingdom, at the death of Lothaire, 950 A.D., claimed the remainder, and was recognised king of Italy. To confirm his title, he endeavored to marry his son Adalbert to Adelaide, widow of Lothaire, and failing in his negotiations, had recourse to force. In her distress Adelaide invoked the assistance of Otto, who flew to her rescue, and married her himself. Berengar was reduced to vassalage, and was permitted to govern Italy as a fief. His faithlessness and tyranny exasperated all classes of society against him, and the people, princes, priesthood, and pope, with one voice, again called Otto to their relief. The latter a second time proceeded to Rome, defeated Berengar, and banished him to Bamberg, 960 A.D. The iron crown of Lombardy was placed upon his head, and soon after he received from Pope John XII. the golden imperial crown, 962 A.D.

Otto had not long departed from Rome, before the same pope who had crowned him treacherously planned rebellion against him, and incited the people to resist his authority. Hearing of this treachery, Otto hastened back to Rome, and promptly suppressed the movement. At a general synod he caused the deposition of Pope John XII., and the election of Leo VIII. in his place. Otto was obliged to visit Rome twice more to quell sedition, but the severity with which he found it necessary to punish crime increased the popular animosity. He died in 973.

His younger son, Otto II., was highly talented, but lacked firmness and moral principle. He ruled from 973 to 983. He won no glory in his battles with France. He tried to wrest Lower Italy from the Greeks and their allies, the Arabians, but lost the battle of Basantello, and died soon after, 983.

Otto III. inherited the troubles which had harassed his father. He intended to transfer the seat of government to Italy; but he met his death there, and it is believed by poison, in the year 1002.

As Otto III. died without issue, the throne of Germany was open for a while to dispute; but the succession was settled upon Henry, duke of Bavaria. His election met with strong opposition in Italy, especially from the margrave Ardoyn; but Henry at last overcame all obstacles. He died 1024 A.D., and with him ended the Saxon dynasty.

For the selection of a new monarch, the spiritual and temporal princes of the German nation assembled in council, between Mayence and Worms.

They chose the Franconian prince, Conrad II., who, on account of his immense domains on the Saale, was surnamed the Salian. The Saxons very reluctantly saw the crown pass to the Franconian line, and their opposition placed Conrad in a difficult position from the very first. But he grasped the political helm with a powerful hand; kept the refractory lords of the empire in proper subjection; and thus bequeathed to his son a dominion consolidated at home and respected abroad.

Henry III., early designated to the succession by his father, began his reign in 1039. Under his rule Germany eclipsed in grandeur and influence all the other states of Christendom. Since the days of Charlemagne no prince had governed with such ability and dignity. He died in 1056, and was succeeded by his son, Henry IV.

During the minority of Henry IV., who on the decease of his father was only six years of age, the cares of the empire devolved on his mother, Agnes. The German nobility, irritated at having a woman at the head of the government, again distracted the empire with intestine feuds. They persecuted every person whom the empress honored with her confidence, and bitter factions began to prevail. One of the conspirators, Hanno, archbishop of Cologne, seized prince Henry, and carried him to his palace, where he was treated with great rigor and unkindness. Hanno himself took possession of the regency. It was the fortune of Adalbert, bishop of Bremen, to free Henry from his confinement, and to carry him off to the Saxons. In this way two high ecclesiastical dignitaries, the one by a system of selfish austerity, the other by indulgence and flattery, had ruined the disposition of the youthful king, who, at the age of fifteen, oppressed the Germans, and above all, the Saxons. The latter, as well as the Thuringians, rebelled against his government, and, in conjunction with other conspirators, set up a rival king first in the person of Rudolph, the Suabian, and, subsequently, in Hermann of Luxemburg. The Saxons finally accused him to Pope Gregory VII. (Hildebrand). This pontiff had long entertained a desire of fully divorcing the church from the influence of the state, and of making the papal see the arbiter of kings and princes, investing it with the highest power on earth. As a prudential measure he therefore ordered all ecclesiastics to remain in celibacy, so as to have no families dependent upon the temporal power, and thus weaken or divide the influence and fortunes of the church. No priest was to be responsible to temporal power. He also ordained that priests should not receive investiture at the hands of laymen, and forbade the acquisition of cures by purchase. All the kingdoms of Christendom were to be papal fiefs, and without the consent of the holy see no prince, king, or emperor, should be elected. Gregory was precisely the man to prosecute these reforms, and though his preachers of celibacy were beaten and killed by the people, though he was himself once deposed and cruelly ill-treated in Rome, he nevertheless persevered, through strife and bloodshed, until he brought the hierarchy to the pinnacle of power.

Gregory was well disposed to listen to complaints against a king who had once deposed him, and he immediately excommunicated Henry.

If Henry had possessed the affections of his people, it is likely that he would have been spared the mortification of undertaking a pilgrimage to Rome as a suppliant, and during a three days' penance (January 25-28, 1077), in the open yard of the Castle of Canossa, to beg of the pope the removal of the ban. He obtained absolution, but he was not allowed to return to his throne until he had undergone a personal examination by the pope with regard to the conduct of the internal affairs of his government.

Enraged at this painful humiliation, the princes of Lombardy, who felt themselves degraded in the person of their king, rallied to his support, and called upon Henry to avenge this indignity. In the splendor of restored majesty, and with an enthusiastic army, he traversed the papal territories. But the alarming report from Germany reached him, that disloyal nobles had elected Rudolph of Suabia king. Henry immediately returned across the Alps, and hastened to the scene of revolt. Only a few secular princes declared in his favor, but all the bishops, except five, and most of the cities, supported his cause. War naturally followed, and the contest was tedious, sanguinary, and changeable. All Germany was one vast theatre of rage, faction, and bloodshed. Parties everywhere ranged themselves under the watchwords "king," and "anti-king," "bishop" and "anti-bishop." Rudolph did not long wear his usurped crown. He and Henry met, after a three years' struggle on the field of Mölsen, near Merseburg, 1080 A.D. For a long time the issue remained doubtful, when a young knight of Henry's army, Godfrey de Bouillon, riding up to Rudolph, with a single blow severed his sword-arm from the body. The wound proved mortal. Rudolph's duchy had already been assigned to the brave and noble Frederic of Hohenstaufen, Henry's son-in-law. The other rebels were also punished. Welf lost his duchy, and Leopold of Austria his margraviate.

The pope meanwhile had again placed Henry under the ban, and given his support to Rudolph; but Henry resolved to avenge himself on the pope. Accompanied by an anti-pope, Archbishop Guibert of Ravenna, chosen pontiff by a synod held at Brixen, he set out for Italy, 1081, conquered Rome, caused himself to be crowned emperor, and besieged Gregory in the Castle of St. Angelo. The pope remained a prisoner in the castle for three years, but was at length liberated by Robert Guiscard, a Norman duke in Calabria, and removed for safety to Salerno, where he died in 1085.

By the death of Gregory VII. Henry had lost his most formidable enemy. The Germans indeed had elected a new anti-king, Count Hermann of Luxemburg, but he was no match for Henry, and soon relinquished his dignity. The Saxons, too, soon inclined to peace. The declining years of the aged monarch were embittered by the conduct of his sons. Both Conrad and Henry allowed themselves to be won over to the papal party. Gregory's successors, Urban II. and Paschal II., had revived the ban against Henry, whose son Henry, under the assumed pretext of piety, declared that he could not preserve friendly relations with a parent who rested under the penalty of excommunication. By infamous intrigue he took possession of the throne and imprisoned his father. The unhappy

emperor, however, soon escaped. At Liège he marshalled an army to punish his son; but in the midst of this campaign he died, 1106 A.D.

Henry V., now no longer requiring the assistance of the pope, at once laid aside the mask, and began a contest with the pope in regard to the right of investiture, which continued until 1122, when a final adjustment of the question was made under the successor of Paschal, Pope Calixtus. At the conclusion of this dispute, Henry found himself embroiled anew with the nobility of the empire. His whole life was thus disturbed, and in 1125, in the flower of his age, he died without heirs, and was the last of the Franconio-Salian house.

The Eastroman empire was governed at Byzantium, from 802 until 1078, by two empresses and twenty-four emperors. Frequent ruptures occurred between themselves and the barbarians, and every treaty contributed to the weakening of the empire. Disastrous alliances were concluded with the Bulgarians, Arabs, and Turks, to the latter of whom province after province was ceded. Spain, on the contrary, made noble efforts to deliver herself from the yoke of her oppressors, the Arabs. In this enterprise the Spanish hero, Rodrigo Diaz, Count of Bivar, usually called the Cid (Lord), shone conspicuously. After a series of adventures, this chieftain conquered Valencia, and rendered the Saracen princes of Toledo and Seville tributary to his master, King Ferdinand, who reigned from 1035 to 1065. The kingdom of Portugal, near the end of the eleventh century, was taken from the Moors, but acquired its independence from Spain only in 1109.

In England, King Alfred the Great (871-901) fought against the Normans from Denmark, who made frequent attacks upon the country. Alfred in the beginning was defeated, and fled; but collecting reinforcements he again took the field, and was victorious. Under his successor the war was renewed by the Danish king, Sven, who, with his son Canute, and Olaff of Norway, invaded the island, plundered it without mercy, and finally placed himself on the throne of England. To his three kingdoms, Denmark, Norway (of which he was liege lord), and England, Sven added South Scotland. He died in 1035. After ruling England for twenty-five years, the Danes were expelled, and Edward the Confessor obtained the English crown, 1041, and with his death (1066) the house of Alfred became extinct. He was succeeded by William, duke of Normandy, who won the crown, to which he had only remote claim, on the battle-field of Hastings. He had repeated rebellions to quell, for the English submitted to the foreign dynasty with great reluctance.

As Normandy had been a fief of France, and a vassal could not lawfully conquer for himself, the French kings declared England tributary to France. This claim was resisted: and thus arose those fearful and bloody contests which lasted four hundred years.

The Normans also took possession of Lower Italy. Even the founding of the Russian empire is ascribed to them; for a Norman tribe called Waregers, under Rurik, Oskold, Dir, Sineus, and Truwor, coming from the Baltic, entered the provinces near the Neva, Dnieper, and Wolga, about the

year 860, subjugated these districts, and penetrated as far as Kiew and Novogorod.

Of the Asiatic empires, the Arabian Caliphate of Bagdad had reached its highest splendor under Al Mansur, Harun Al-Rashid, and Al-Mahmun. The realm, however, was soon after split into several divisions; and thus materially weakened, it fell at length into the hands of the Turks. The Arabs of this period were distinguished for science and art, especially architecture.

Towards the close of this period also commenced the Crusades, of which we shall treat more fully hereafter.

THE HOUSE OF HOHENSTAUFEN.

After the extinction of the Frankish imperial house by the death of Henry V., 1125, the Germans elected king Lothaire duke of Saxony. He was, however, vigorously opposed by the two Hohenstaufen, Frederic of Suabia and Conrad of Franconia. In order to fortify himself against these enemies, he formed an alliance with Henry the Proud, Duke of Bavaria, giving him his daughter in marriage, and his own duchy of Saxony as dowry. This possession made Henry the most powerful prince in Germany, so that when Lothaire died childless in 1137, he, as his son-in-law, ventured to claim the succession, and to seize the imperial jewels. But the people, fearing rather than loving his character, refused to elect him, and chose for emperor Conrad of Hohenstaufen. With him began a line of powerful monarchs, of the house of Hohenstaufen, whose members at first resided at the castle of Hohenstaufen in Suabia. The rejected Henry was deprived of his duchies and outlawed. Saxony fell to Albert the Bear, Margrave of Brandenburg, and Bavaria to Leopold, Margrave of Austria. Henry, enraged at this partition of his territories, marched an army against Albert, whom he effectually subdued, but before hostilities commenced with Leopold, he died, 1139.

His son Henry, afterwards surnamed the Lion, only recovered Saxony. Welf, a brother of the deceased, lent him his aid in asserting his claims to the paternal inheritance, and at last strove to vindicate them in a battle with Conrad, near Weinsberg, 1140. From the battle-cry of the Bavarians, "Here Welf!" and that of Hohenstaufen, "Here Waiblingen!" (the name of a castle belonging to this family) originated the party names Welfs (Guelphs or Bavarians) and Waiblingens (Ghibelines or Suabians); and the bitterest feuds between these political factions existed for centuries. Welf lost the battle; and Conrad having stormed Weinsberg, permitted none but the women to leave the town, with the clause, however, that each might take with her the object which she might deem most valuable. The women had recourse to the stratagem of carrying off their husbands as their best treasures. Conrad died in 1151.

He was succeeded by his nephew Frederic I. (Barbarossa), a most heroic and sagacious monarch, who reigned from 1152 to 1190. Bavaria was now restored to Henry the Lion, and Austria made a duchy independent of

Bavaria. Frederic also sought to re-establish the imperial power in Italy by many a hard battle; after which, he was compelled to conclude an armistice for six years, with his rebellious subjects in Italy, who had completely defeated him at Lignano, 1176. Henry the Lion having deserted his cause in this decisive battle, and thereby principally caused his defeat, Frederic, on his return to Germany, confiscated his duchies and other fiefs, which he distributed to others, allotting Saxony to Count Bernard of Anhalt, son of Albert the Bear, who gave the first impulse to the importance of Brandenburg; while Bavaria was assigned to Palatine Otto of Wittelsbach, the progenitor of the yet reigning house of Bavaria. Henry the Lion commenced an armed resistance, but was very soon humbled, and compelled to throw himself on the clemency of the emperor. Frederic, in remembrance of his former friendship, pardoned him, and restored to Henry his allodial possessions, Brunswick and Luneburg; but at the same time banished him for three years. The offender passed his exile in England.

At the expiration of the six years' armistice with the Lombards, peace was fully concluded by the treaty of Constance, 1183. Frederic also became reconciled to the Norman king of Lower Italy, who had allied himself with the party of the Welfs; and married his son to the Norman princess Constantia, heiress to Naples and Sicily, in order to enhance the glory of the house of Hohenstaufen.

The aged Frederic, leaving the government of his empire to his son, later known as emperor Henry VI., undertook, in the evening of his life, a crusade to Jerusalem. But he was not permitted to gaze upon the tomb of the Redeemer. He died 1190 A.D., near the borders of Syria, to which, after many dangers, he had led his triumphant hosts.

Henry VI. was inferior to his father in talents and virtue; and, though he ascended the throne under more favorable circumstances than his father, he was less successful. Through his cruelty, avarice, and perfidy, he alienated the affections of his subjects, and, after a brief reign, died unregretted, 1196.

The German princes did not feel bound to recognise the claims of Henry's infant; and wishing at the same time to terminate the supremacy of the Hohenstaufen, they elected Otto of Brunswick, son of Henry the Lion. The Hohenstaufen party, in the meantime, chose Philip of Suabia, who already governed as regent of the empire. Philip proved too crafty and powerful for his rival. His cause was also strongly supported by Philip Augustus, king of France, and for some time by Ottokar I., king of Bohemia, upon whom he had conferred the hereditary royalty. And although subsequently Ottokar deserted him, several cities following his example, and Pope Innocent III. excommunicated him, Philip, nevertheless, retained the support of the majority of the princes, and at last compelled Otto IV. to flee to England.

The crafty and daring pope availed himself of these civil dissensions in Germany, in order to augment his own power in Italy. With the cities of Lombardy he concluded an advantageous treaty (League of the Guelphs) against the emperor. Afterwards, however, he became umpire between

Philip and Otto, dictating the arrangement that Philip should be sole emperor, and Otto his successor. He then revoked his anathema, and Philip in turn gave his sanction to the pope's acquisitions in Italy. Philip was soon after murdered, 1208, in revenge for some imaginary offence, by Otto of Wittelsbach, the nephew of him who had been elevated to the ducal dignity by Philip's father.

Otto IV. now succeeding to the throne, demanded the restoration of the countries which the pope had acquired in Italy, and even asserted the right of the empire to the kingdoms of Naples and Sicily. Innocent pronounced an anathema against Otto, and set up as his rival the Sicilian prince, Frederic, son of Henry VI., and ward of the pope, but made him promise not to encroach upon the papal possessions or prerogatives. Frederic received at Mayence, 1312, the homage of many princes, and not long after was solemnly crowned at Aix-la-Chapelle. Thus the house of Hohenstaufen again wore the imperial purple.

Frederic II. filled the throne with great glory; he was brave and wise, and distinguished for all the virtues of a perfect prince. His reign was marked by numerous wars with the popes, Lombards, and rival kings. In Germany, Otto IV. was soon eclipsed by him; but in Italy the pope frustrated his efforts to unite that country with Germany as a hereditary empire. Frederic had promised to undertake a crusade, and as he did not redeem his pledge in proper time, Gregory IX. placed him under the ban. He at length started on the crusade, 1228 A.D., but did not thereby reconcile the pope, who even strove to excite general opposition to the emperor in Palestine. But Frederic triumphed over all obstacles, meeting everywhere with the most astonishing fortune. He concluded with the Saracens a ten years' armistice; Jerusalem, Bethlehem, and Nazareth, submitted to his arms, and in the Church of the Holy Sepulchre he crowned himself king of Jerusalem. Returning triumphant to Italy, he expelled his enemies from his dominions, and was at length reconciled with the pope. For his new hereditary possessions in Italy he provided most admirable regulations.

A new insurrection broke out in Germany, headed by his son Henry, who had governed during his father's absence. Frederic suppressed this movement, and sent his son to prison in Italy, where he died seven years after. In 1237, Frederic obtained a complete victory over the Milanese at Corte Nuova. Gregory IX. once more excommunicated him. Innocent IV., Gregory's successor, entered readily into the quarrel. In a synod at Lyons, he accused Frederic of perjury, heresy, and impiety; and the assembly not only reiterated the anathema, but deposed Frederic from his crown and dignities. His German opponents elected Henry Raspe, Landgrave of Thuringia in his place, 1246. Raspe enjoyed his elevation but a short time; he was beaten by Henry's son, Conrad, and died the following year, 1248. William, Count of Holland, was next advanced by the papal party. Frederic, in the meantime, fought with the revolted Lombards, but his fortune had left him. Many of his best friends fell by his side, and the fickle joined his enemies. At last, after losing a battle, and seeing his son

Enzius taken captive, his heart being overwhelmed with grief, especially at the proscription of the church resting on him, he died in 1250.

His son, Conrad IV., had to contend with the opposition of his rival, William of Holland. He died, probably by poison, in 1254, the year of Pope Innocent's decease.

A sadder fate was awaiting his son Conradin. In his efforts to recover from Prince Charles of Anjou his hereditary provinces of Naples and Sicily, which the pope had given to the latter, himself and his friend Frederic of Austria were taken prisoners. On the scaffold at Naples, the royal youth, the last of the Hohenstaufen, fell under the executioner's axe.

During an *interregnum* of eighteen years, anarchy prevailed in Germany, which was during that period ruled mostly by foreigners. At length Rudolph of Hapsburg was elected by the German princes, 1273. He gained great popularity by the evident capacity which he exhibited for government. A true father of his people, he had nothing more at heart than to restore tranquillity to the empire.

Ottokar II., king of Bohemia, having refused to recognise the authority of Rudolph, was deprived of his dominions, and proscribed, 1277; he then commenced a war, but perished in the unfortunate battle of Marchfeld, 1278. His son, Wenceslaus II., retained Bohemia and Moravia; but Austria, Styria, and Carniola, the former fiefs of Ottokar by marriage, were transferred to Rudolph's sons, Rudolph and Albert, 1282. Rudolph managed to preserve friendly relations with the popes, and confirmed them in their right to the papal states; but no persuasion could induce him to visit Italy, in order to be crowned emperor. He failed in procuring the succession for his son Albert, though he rendered his family strong and popular. He died in 1291, and his body was deposited in the cathedral at Spire.

After a brief *interregnum*, Adolphus, Count of Nassau, was raised to the dignity of emperor, 1291. He was, however, soon deposed, but not without resistance. He lost both crown and life in the battle of Worms, 1298.

The princes now supported the proud, imperious, and gloomy Albert I. This emperor aimed only at personal aggrandizement; but his ambitious progress was boldly arrested by the free inhabitants of Switzerland. Hitherto, the Swiss Cantons on the Vierwaldstädt Lake had recognised the German rulers merely as liege lords, but Albert earnestly strove to attach them to his empire. The Swiss rejected the interference of his wicked governors, and drove them from the country, after the brave archer, Tell, had killed Gessler, to which deed he had been provoked in a private but just cause.

Impelled by his courageous spirit, Albert again endeavored to subdue the brave Swiss, but he fell, 1308, by the hands of his cousin John of Suabia, whom he had despoiled of his patrimony. The Cantons of Switzerland now formed the mutual alliance known as the Swiss Confederation, and bravely fought for their liberties at Morgarten (1385), Sempach (1386), and Näfels (1388). It was at Sempach that the celebrated Arnold of Winkelried so nobly sacrificed himself for the good of his country, by burying in his own

breast as many of the enemy's lances as he could embrace, thus making an opening in their line through which his brethren poured in, and scattering the Austrian forces, gained the battle.

Henry VII., Count of Luxemburg, who obtained the German crown, 1308, died of poison, 1313, in Italy, where he had gone to re-establish the German claim of empire. On his death, Frederic of Austria and Louis of Bavaria appeared as rival candidates for the vacant throne. After a contest of more than seven years, Louis secured his own election, and received the purple, 1322. Pope John XXII. had officiated as arbiter during the existence of the quarrel, intending to secure the crown to the French king. Greatly displeased at the accession of Louis, the pope demanded of him to deposit his crown till the papal decision had been made. The king of course declined the suggestion, and even gave efficient aid to John's enemies in Italy. The pope, at this time, resided at Avignon in France. He at once thundered forth his ban and interdict against Louis, 1324. The latter, in turn, appealed to a general council, which deposed John and replaced him by Nicholas V. Louis then had himself proclaimed emperor in Rome, by excommunicated bishops, 1328. The decease of John did not disperse the adversaries of Louis, who now found himself opposed by Charles, Margrave of Moravia, who had been nominated to the throne of Germany by the party of Clement VI. He was too timorous to carry out his scheme, when, fortunately for him, Louis died, 1347. He then ascended the German throne under the name of Charles IV. He aimed chiefly at his personal advantage, and the elevation of his allodial country, Bohemia. With this latter design in view, he transferred the royal residence to Prague, where he also founded the first German university, 1349. He effected an important change in the German constitution. The Golden Seal confirmed the new fundamental law, proclaiming the seven princes who were to elect the German king and Roman emperor, and the place and manner of the election. This was the most prominent work of Charles IV., who died, 1378.

Wenceslaus III., surnamed the drunkard, succeeded his father in the same year, chosen by electors who had been bribed while his father was yet alive.

Rival kings were set up against Wenceslaus, first in the person of Palatine Rupert, and after his death, 1410, in Sigismund of Hungary (1410-1437), his own brother, and finally in Jodocus of Moravia. At the same time, three popes were disputing about the pontifical see.

The anarchy necessarily arising, in consequence of so many different claims to supremacy, renewed the times when the will of the strongest was the only law. Wenceslaus was rough, seldom left Bohemia, and even there terrified his subjects so much, that history has given him the title of the second Nero. Prague having become hardly an eligible place for the cultivation of sciences, the university was removed to Leipsic, 1409.

The confusion of all church affairs, arising from the disgraceful rivalry of the three popes, was finally arrested by the Council of Constance, 1415, convened by Sigismund, when two popes had already been deposed, and a

new one elected, the two former, however, refusing to yield. Now all the three popes were deposed, and Martin V. was elected in their stead; but the much desired reformation of the church was not effected. On the contrary, the doctrines of Huss of Hussinetz, and of Jacob of Mies, tending towards the correction of clerical abuses, were condemned, and their originator, in spite of having appeared at the council under the protection of a safe-conduct from Sigismund, was burned by the decree of the council, 1415. His friend and defender, Jerome of Prague, suffered the same fate the year after.

The result of this event was the bloody Hussite war in Bohemia, 1419-33, the adherents of the new doctrines arming themselves for the defence of their faith. Their army spread terror wherever it went. Fortune seemed to shed her favors upon them, and they soon deposed the king. The party, however, at length split up into factions; the terrors of war disposed the fathers of the church to a reconciliation, and the Hussites themselves were tired of the contest. A new council was assembled at Basle. The Calixtines, who were the more moderate of the Hussites, asking only the use of the cup in the Holy Sacrament, with the concession of some minor points, were received into the communion of the orthodox, 1433, while the Taborites, a name applied to the fanatics of the party, were still refused admission. The Calixtines now persecuted their less fortunate brethren, and the Taborite chief, Procopius, was conquered and killed in battle by Mainhard of Neuhaus, the leader of the Calixtines, 1434 A.D. This catastrophe terminated the war. Sigismund, who, in the meantime, 1433, had received the Roman imperial crown, was again acknowledged king of Bohemia, 1435. He died two years after.

After the death of Sigismund, Albert of Austria, his son-in-law, succeeded to the empire as Albert II. He united in his person the governments of Hungary and Bohemia. He was an excellent, resolute prince, but his reign was cut short by death. He fell in an expedition against the Turks, 1439.

Frederic IV., duke of Styria, and son of Ernest the Iron, a relative of Albert, next ascended the throne. His protracted administration (1440-93) was not signalized in any way, Frederic possessing more of good will than of energy, and not being favored by fortune. His whole reign contrasts pitifully with those of contemporary monarchs in Europe.

In France the Capetians had ruled from 987 to 1328. Several kings of this line presided over the interests of their country with distinguished ability. Louis VI., 1108-37, greatly enlarged the rights and liberties of his subjects. Louis VII., 1137-1180, and Philip Augustus, 1180-1223, distinguished themselves in the crusades. Philip established the class of the peerage, founded the University of Paris, and took the preliminary steps towards making the monarchy hereditary and absolute. Louis IX., surnamed St. Louis, 1226-70, distinguished by his crusades, in the course of one of which he died at Tunis, governed with wisdom the kingdom which his victories and policy had enlarged, and laid the foundation of a healthy freedom for the Gallican church. Philip IV., the Fair, 1285-1314, governed with vigor, and

distinguished his reign by a fortunate contest with the hierarchy (the popes in France). He suppressed the order of the Knights Templars, whose treasures tempted him; and he created an epoch in French history, by convening for the first time a national assembly, known as the States General (*Etats généraux*). He died in 1314, and his three sons, who followed each other in rapid succession, wound up the direct male line of the Capetian kings, 1328.

The Capetians had broken the influence of the nobility in France. The collateral line who next claimed the throne plunged the country into wars with England; and in one of these, under Charles VII., the celebrated Joan of Arc appeared at the head of the French troops, led them on to victory, but was herself eventually taken prisoner, and burnt at the stake.

The dukes of Burgundy, a branch of the French reigning house, acquired considerable importance during this period. John the Good, in 1363, had transferred Burgundy as a fief to his youngest son, Philip the Bold. Philip was succeeded by his son John the Intrepid, 1404–19; he again by Philip the Good, 1419–67, and Charles of Charolois, surnamed the Bold, 1467–1477. There was a constant animosity between France and Burgundy. Charles of Charolois acquired in addition *Franche Comté* and the largest portion of the Netherlands, and maintained at Brussels the most splendid court in Europe. The duke opened negotiations with the king of Germany, Frederic IV., about the title of king, when the latter asked for his son Maximilian the hand of Charles's daughter, Mary, heiress to Burgundy. But differences arose in the course of their conferences, and Frederic, instigated by Louis XI. of France, broke them off entirely. Charles determined that Maximilian should never be allied to his family; but his daughter afterwards engaged herself to the emperor's son by letter.

The crafty duke marched, in 1476, against his neighbor Renatus, duke of Lorraine, and his allies, the Swiss, in order to attach their countries to his own dominion. Having taken Nancy, the capital of Lorraine, and expelled Renatus, he advanced in the same year with 60,000 men against Switzerland. In his attack upon Granson his perfidy and cruelty so exasperated this brave and free people, that they arose with a courage commensurate with their patriotism, and completely routed the Burgundian army, who were obliged to leave their rich camp in the hands of the Swiss. Chagrined at this unexpected misfortune, Charles advanced against them with a new army, but was again defeated at Murten, with a loss of 20,000 men, some falling on the field, and others being driven into the adjoining lake. At a third battle at Nancy, 1477, Charles himself was slain: his army was partly destroyed, and partly deserted him. With Charles the Bold the Burgundian dominion came to an end.

Mary, the heiress of Charles, now married Maximilian I. Louis XI., too, had claimed her hand for his son, who was only seven years old. Maximilian thus became involved in a bloody war with Louis of France, and he demanded the restoration of the Burgundian provinces which Louis had taken. In the war that followed Frederic could not assist his son, as his own dominions were menaced by the Turks and Hungarians. But by

the aid which he received from the Netherlands, he was enabled to conduct a splendid campaign.

In 1480, three years after her marriage, Mary died. Louis once more took up arms, and secured the provinces of Franche Comté and Artois as the dowry for the young Margaret, daughter of Maximilian, destined for the dauphin of France. Maximilian had only the name of emperor, and it was not till after a serious war that his right to the administration was recognised. In 1483 died Louis XI. of France, one of the most subtle despots of his age.

In England the Norman dynasty terminated in 1154, and that of the Plantagenets, under Henry II., began. Henry governed as vassal in France, Normandy, Aquitaine, and Poitou, as well as the counties of Anjou, Touraine, and Maine. Ireland and Bretagne he acquired by conquest. He met with great opposition from his sons, and did not live long enough to redeem his vow of making a crusade. He died in 1184.

Richard the Lion-hearted accomplished the vow made by his father. While distinguishing himself by his prowess in the East, the perfidy of his brother John, and of Philip of France, compelled him to return. The latter was lending his aid to John in his efforts to wrest the crown from Richard.

After the death of Richard, 1199, his brother John (Lackland), disregarding the rights of his nephew Arthur, succeeded to the throne. Philip of France despoiled him of the fairest part of his dominions, and Pope Innocent III. placed England under an interdict, and John under anathema. The king fought his enemies with great disadvantage, and at length yielded to the demands of the church. His nobles also wrested from him the Magna Charta, 1215, an ever memorable transaction in British history. It secured the liberty of all ranks and of every individual against the tyranny of the monarch. He died in his war with Philip. One of his contemporaries says of him, that even hell must have been polluted by his presence.

Henry III., John's son (1216-72), oppressed the people, and a civil war was the consequence. He became involved in a contest with his barons, and in his reign for the first time deputies appeared in parliament from the cities and boroughs.

Under his son, Edward I. (1273-1307), Wales was completely conquered. His successors renewed the bitter contests between England and France in regard to the succession, and in fact Henry V. and VI. assumed to themselves the title of kings of France.

To these wars succeeded civil broils. The families of York and Lancaster (whose respective emblems were the red and the white rose) had been disputing one with another the right to the throne since 1453, when at last Henry VII., by a marriage, put an end to the serious quarrel in 1485. The new dynasty was that of the Tudors, which reigned from 1485 to 1603. The house of Stuart governed in Scotland from 1371.

In the latter period of the Middle Ages Italy appeared torn and weakened. Naples and Sicily, the patrimony of the Hohenstaufen, were groaning under the yoke of Charles of Anjou. In the year 1282 Sicily rid herself of the French rule. The Sicilian Vespers, on the second day of

Easter, 1282, were the appointed signal for a general massacre of the French, who were attacked simultaneously all over the island. Peter of Arragon aided in the rebellion, and the insurgents at last prevailed. Charles in vain attempted to recover his possessions. Naples remained 200 years separated from Sicily, and finally, also became part of the kingdom of Arragon, 1458, after having endured frequent changes of rulers.

The papal court had resided at Avignon from 1305, and the Romans longed for its return to the Eternal City, for the sources of their wealth had been much impaired by its departure.

The old noble families of the Colonna and Orsini were waging war with each other. Rienzi, a young and ambitious plebeian, made a vigorous effort to exterminate the nobility, and to revive the glories of the ancient republic; but the fickle populace deserted his cause. He was murdered, 1354. Gregory XI. restored the pontifical residence to Rome, 1376. From that period the papal power suffered severely by sequestrations. It did not recover its political supremacy till much later, under Nicholas V., Paul II., Alexander VI., and Julius II.

At this period the Marquis of Este, lord of Modena, increased in wealth and power. Savoy belonged to Burgundy, but in 1416 the counts (at a later period dukes) of Savoy gradually founded an independent power.

The political ascendancy of Pisa sank in the 12th century through its contest with Genoa, which now rose so rapidly as to acquire a footing in Provence and Marseilles, and secure valuable commercial advantages upon the eastern seas. Genoa, however, labored under constant internal strife, which weakened its strength and encouraged its enemies, one of whom, Venice, after a long war, secured the supremacy. The severest exactions were imposed on Genoa by its tyrannical doges; and it was finally subdued by the dukes of Milan or the kings of France.

Florence felt the revolutionary spirit of the age. At times the nobles oppressed the people, then again the mob had all the power. Through the government, policy, and virtues of the noble house of the Medici, she at length rose to a magnificent position among the nations. One of this family, Cosmo di Medici, was immensely rich; he presided over the state, yet he kept up the form of republican government. While in the enjoyment of power, his virtues shone with undiminished splendor, and his noble generosity to the people made him very popular. The persecutions of his enemies only contributed to elevate him the more, for when they succeeded in banishing him, he was recalled with great honors, and the people proclaimed anew their attachment to him. Cosmo died in 1464.

His son Pedro was exposed to a powerful opposition, but it did not resolve itself into a conspiracy until the time of his amiable sons, Lorenzo and Julian, 1442. At the bottom of the plot were the Florentine house of Pazzi, and Salviati, archbishop of Pisa, who laid a cunning scheme for the assassination of the brothers. The villains succeeded in mortally stabbing Julian; but Lorenzo escaped, bleeding from seven wounds. Proper punishment was at last meted out to these murderers by the people themselves.

Lorenzo had to bear up against the hostility of Pope Sixtus IV. and of Ferdinand I., king of Naples; but he gallantly defended himself against both, and became the benefactor of his people. He died in 1492.

In Milan the family of the Visconti won great consideration. One of its members, John Galeazzo, purchased the title of duke, in 1395, of Wenceslaus, the German king, and soon swayed the government of twenty-two Italian cities. When the male line of the Visconti became extinct, in 1447, Francis Sforza assumed the ducal crown, and governed with some renown. He died in 1467. His son, Galeazzo Maria, was murdered by conspirators in 1476. John Galeazzo, son of Maria, was recognised as successor, but was at length poisoned by his uncle and guardian, Louis the Moor, who seized upon the regency. Louis himself finally fell a victim to his own intrigues.

In Spain the chief power of the Christians was vested in two leading houses, those of Castile and Arragon. On the latter, Majorca, Sicily, and Sardinia, were dependencies. The Arabian caliphate, in the south, lost one province after another. By the marriage of Ferdinand II. of Arragon with Isabella of Castile, 1469, the two Christian states were more closely allied; but Spain only consolidated her government in 1516. In 1492 the kingdom of Granada passed from the hands of the Mohammedans to those of the Christians. The same year witnessed the discovery of America by Christopher Columbus, an event of importance not only to Spain but to the world at large.

Portugal, which for a long time was governed by dukes, rose in 1139 to the dignity of a kingdom, and Algarvia was allotted to it in 1253. By the aid of the crusaders Lisbon was wrested from the Moors, 1147. The reign of Dionysius (Dinez) the Just, extending from 1279 to 1322, was remarkably fortunate. His grandson Pedro, 1357, immortalized in song by his romantic passion for Inez de Castro, likewise ruled with much ability and justice. With the death of his son Ferdinand, 1383, the proper Burgundian line became extinct; for though John II. of Castile, husband of Ferdinand's daughter, claimed the throne, the popular voice called for Prince John, natural son of Pedro, and grand master of the order of Aviz. His reign lasted fifty years, and was very glorious and prosperous.

During this century the Portuguese, under the patronage of Henry, third son of John, commenced their voyages of discovery, and met with great success. Their bold seamen passed Cape Non on the African coast, and discovered Madeira and the Azores. The immediate successors of John, Conradin I. and Alphonso V., permitted the interest in these voyages to decline, but John II. (1481) manifested the same predilection for maritime affairs as John I., and, above all, made the East Indies the object of his enterprises, in order to wrest their commerce from the Genoese and Venetians. Africa's most southern point, Capo Tormentoso (afterwards called Cape of Good Hope) had already been discovered, when John died, and left his eastern plans to be completed under Emanuel the Great, by Vasco de Gama.

The kingdom of Denmark had reached its greatest extent under Waldemar I. (1157-82) and Waldemar II. (1202-41); but in 1223 it lost Holstein,

Mecklenburg, Lubeck, and Hamburg. The house of Estritson reigned until 1448, when it was succeeded by that of Oldenburg.

In Sweden the house of Stenkil passed away, 1130, for that of Swerk, a Goth, and this again yielded (1222) to that of Bonde. In 1250 the line of the Folkungs began; it ended in 1389.

The old Ynglingian dynasty prevailed in Norway from 875 until 1319. Margaret, daughter of Waldemar III., and wife of Hakon VIII., king of Norway and Sweden, and guardian of her son Olaf, in Denmark, achieved a union of Sweden, Norway, and Denmark (the Calmar Union, 1397). While the kingdoms were brought within one confederation, each preserved its own laws and constitution. Erick of Pomerania, a grandson of her sister, was destined to govern the united countries after her; but Sweden and Norway looked with jealousy and envy upon Denmark, as the favorite state; besides, his tyranny at length drove the Swedes to rebellion. Even the Danes could not brook the intolerant rule of the government at Copenhagen. In 1436 Charles Canuteson Bonde was appointed governor of the empire; Erick fled to Gothland, and the Danes, 1439, elected his nephew Christopher, prince of Bavaria, whom the Swedes and Norwegians also recognised. He enjoyed a more tranquil and fortunate reign. At his death, 1448, the Danes conferred the royal dignity on Christian I., count of Oldenburg and Delmenhorst, and in 1450 the Norwegians, too, elected him. He was the son of Dietrich of Oldenburg, who had married Hedwig, sister of Count Adolphus VIII., of Holstein, 1449. Christian received Schleswick and Holstein by a solemn guarantee of their liberties; but his brother Gerard succeeded to the patrimonial inheritance.

In Sweden the diet had elected Charles Canuteson Bonde king, but owing to a quarrel with the clergy, he was banished from the kingdom. After Christian I. had ascended the throne Charles was recalled. On his death, his sister's son, Sten Sture, was chosen governor, and maintained himself against the machinations of Christian. John, the son of Christian, was elected after the death of Sten Sture, but by the abuse of his power he drove the Swedes to revolt, and the Stures again won the supremacy. In Sweden and Norway John was succeeded by his son, Christian II., 1513.

In the meantime the German order of Lords had converted Prussia to Christianity, while the order of the Brethren of the Sword had accomplished the same in Livonia and Courland. They also created these powers independent states. By the peace of Thorn, 1466, Poland obtained the whole of West Prussia, and the grand master of the Brethren of the Sword governed East Prussia as a Polish vassal. Poland and Silesia suffered severely from the Mongolian incursions, but won a decided victory at Liegnitz, 1241. In the thirteenth century the various Polish dependencies were united under the names of Great and Little Poland, and in 1305 the two divisions were combined, under King Vladislaus Loktieck. Among all his successors none were more distinguished than Casimir the Great, of the house of Piast (1333-70). His successor Louis, who was also king of Hungary, having confirmed the Poles in their freedom and nationality, they chose his daughter Hedwig queen, 1384. She soon

after gave her hand to Prince Jagello, and the crown remained in his line until 1572.

In Hungary the Anjou-Neapolitan line obtained the throne in 1308. The Arpad dynasty had expired in 1301. Charles Robert (1308-42), the first king of the new dynasty, received the crown by right of his mother. Under the brilliant reign of Louis the Great, mentioned as king of Poland (1342-82), Hungary was remarkable for her power and civilization. At his death his daughter Mary, wife of Sigismund, succeeded to the throne, while, as before remarked, her sister Hedwig became queen of Poland.

During the fifteenth century the Turks frequently caused great trouble to Hungary; and at Varna, 1444, the Christian army met a most terrible defeat. King Vladislaus fell on that bloody field. The Hungarians now called Matthias Corvinus, son of John Hunyades, to the throne, 1458. His arms were victorious. He not only routed the Turks, but increased the domain of the empire by the conquest of Vienna, Carinthia, Styria, Silesia, Ukraine, and Moravia. His reign was noted also for great advances in knowledge and art. He died in 1490 A.D.

Russia was divided into more than fifty districts. It fell an easy prey to the rapacity of the Mongols. Among the conquered princes Alexander Newski, of Novogorod, was distinguished. He died in 1263. In spite of his dependence, he vanished near the Neva, in 1240, the Swedes, Lithuanians, and the Brethren of the Sword, who, since 1237, had united their order to that of the German Knights. Sartak elevated Alexander, in 1252, to the principedom of Vladimir, and his son obtained Novogorod.

Internal divisions at length weakened the Mongol power in Russia. Iwan I. made Moscow his residence, united several leading principalities, and, with the consent of the Mongolian Khan, his sons took the title of Grand Dukes of all the Russias. By enlarging the limits of the confederacy, sufficient force was at length secured to throw off the foreign yoke. This was effected under Iwan III., son of Wasili III. Dimtrii (Donskoi) had previously made a similar attempt, and had been fortunate in gaining great victories over the Tartars at the Don, 1380. Owing to the breaking up of the Mongol khanate of Kaptshak into the principalities Crimea, Kasan, Astrachan, and Turan (Siberia), and the consequent division of strength, Iwan's success was greatly facilitated. The khan of Kasan was compelled to implore peace in 1469. Henceforth Iwan appointed the khans, and took the title of Czar, and placed upon his escutcheon the double eagle. Novogorod succumbed to the Muscovite dynasty, and Khan Achmet fell, 1480.

The government of the Greeks came to a final close in the fourteenth century. They had to yield to the victorious Turks the provinces of Asia Minor. The latter, under their commander Orchan, secured a residence at Prusa, in Bithynia, 1327. In the year 1357, Soliman and Murat, sons of Orchan, crossed the Hellespont, and capturing Gallipole, obtained a footing in Europe, conquering Thrace, Thessalia, Macedonia, and Bulgaria, and in 1362 they established themselves in Adrianople.

John IV. only retained the capital of Thessalonica and a few districts of the Morea, with some of the Archipelagan islands. Bajazet, son of Amurath,

1389-1403, was famed for his victories. His most memorable triumph occurred in 1396, when he totally destroyed the Christian army, under Sigismund, king of Hungary. The emperor was compelled to permit the establishment of a mosque and the appointment of a *cadi* in his capital, and would probably have lost his throne to the sultan had not the latter been attacked by an enemy more powerful than himself. This was Timur, or Tamerlane, prince of the Mongols (born 1336, at Kesh, near Samarkand). In 1402 the Mongol and Ottoman armies met upon the plain of Angora (the ancient Ancyra), in Asia Minor. Bajazet lost the battle, and being made captive, was borne off by the conqueror in an iron cage. Death released him from his disgrace in 1403. Tamerlane died on his march towards China, with his plans of conquest yet unfinished.

Musa, appointed sultan by Tamerlane, assassinated his elder brother, but finally perished himself by the hand of his younger brother, Mohammed I., who restored the Turks to power, and harassed the Christian states.

His son and successor, Amurath II., marched against Constantinople, 1422, but without conquering it, contented himself with imposing upon the Greek emperor severe exactions. In 1444 he won a splendid victory at Varna, over Vladislaus, king of Hungary and Poland, and nearly annihilated the forces of John Hunnyades at Kassova.

Mohammed II., son of Amurath, disregarding the treaty between his father and the Byzantine power in 1453, began the siege of Constantinople. The Greek empire had already sunk so low that the immediate vicinity of the capital constituted its only domains. When Constantine XI. ascended the throne, Mohammed advanced with his forces, which Constantinople could not resist. Constantine XI. displayed a wonderful courage. On the fifty-third day of the siege the imperial city was laid waste. Constantine and his noble friends fell in the conflict, the Byzantine throne was overwhelmed, and the Greek empire was no more.

The rest of Greece soon passed to the hands of the Turks; the provinces of Bosnia and Servia rendered submission to Mohammed; Albania alone made successful resistance under the celebrated Scanderbeg. The important fortress of Belgrade defied all efforts for its capture, in 1456. Rhodes, too, bravely opposed the Turks. In other directions, however, Mohammed's enterprises were more successful. He drove the Genoese from the Crimea, and spread alarm throughout Italy and all the western part of Europe. Otranto yielded to his arms in 1480. He died the following year while on his expedition against Usum Hassan, the Turkoman conqueror of Persia. During a period of thirty years, Mohammed had conquered two empires, twelve kingdoms, and two thousand cities. The Christian cross was displaced by the Moslem crescent, and the capital itself took the Turkish name of Istamboul.

About this period the Mongols, a nomadic horde, began to assume a leading rank among the tribes of Central Asia. One of their hereditary leaders, Temudchin, by his valor and cruelty managed to obtain the command of a few neighboring tribes, and soon attained the supremacy over all the Mongolians. He assumed the title of Tshinghis Khan (Great Khan), and

began his conquests by a war against China, 1209. After passing the Great Wall, he penetrated the interior and fired Pekin, which continued burning an entire month, in 1215, subdued Bukhara and Chowaresem, invaded Tangut, and destroyed Nanking.

He died in 1227, and the conquest of China was completed by his sons and his grandson, Batu. The latter humbled the caliphate at Bagdad, and made the Turkish sultan of Iconium his vassal. Batu also directed the Mongol invasion of Russia, 1237, and under him Peta advanced as far as Silesia, 1241. He died in 1256.

These immense conquests, so rapidly made, caused the empire to extend from China to the Vistula; but it was soon dissolved into single khanates. Out of one of these districts arose the mighty Tamerlane, to restore for a brief season the glory of his nation. He united the three Mongol tribes, and made himself master of Asia Minor, Central Asia, Persia, and Hindostan, in the last of which one of his successors, Baber, founded, in 1519, the kingdom of the Great Mogul.

Of the African states of this period Arabia was pre-eminent until 1254, when Mamelouk Egypt rose to be the first in power and rank.

Before passing on to a sketch of the civil condition of the nations of the middle ages, we call attention to the objects represented in our plates as illustrative of the period of whose history we have now completed the outline.

Pl. 22, fig. 9, sword of the Frankish king, Childeric; *fig. 10^a* and *b*, forms of the chalice in the mass; *fig. 11^{a, b, c, d}*, specimens of the edging on the tunic, the sandals and martial dress of Clovis; *fig. 12*, the crown of Clovis; *fig. 13*, clasp worn by Queen Chlotilda; *fig. 14, 15, a* and *b*, girdle ornaments; *figs. 16–20*, a style for writing, buttons, buckles, and rings; *fig. 21*, one of 300 golden bees in the royal cloak of Childeric; *fig. 22*, royal sceptre of Lothaire II.; *figs. 23–25*, throne and ottomans; *fig. 26^a* and *b*, metallic thrones of Dagobert; *figs. 27^a* and *b*, and 28, royal caps and crown of the Merovingian family; *fig. 29*, bishop's mitre; *fig. 30*, seal of Childebert III.; *fig. 31^{a, b}*, and *c*, sceptre, hand-of-justice, and crown of Charlemagne; *figs. 32–34*, three of Charlemagne's swords; *fig. 35^a* and *b*, two of his shoes; *fig. 36^a* and *b*, part of his girdle and one of his spurs; *fig. 37*, bishop's crosier; *figs. 39* and *40*, throne and ottoman; *fig. 41*, chest for the preservation of valuable objects; *fig. 42*, flutes; *fig. 43^a* and *b*, incense vessels; *fig. 44*, shears; *fig. 44^b*, hand basket; *figs. 45* and *46*, hatchet and axe; *fig. 47*, small sword; *figs. 48^a* and *b*, 49^{a, b, c}, and *d*, various cooking utensils. (The objects included between *figs. 39* and *49* belong to the age of Charlemagne.) *Figs. 50–52*, lounge or sofa, chest, and money safe; *fig. 53*, bed; *fig. 54^a* to *i*, table utensils; *fig. 55^a* and *b*, knives; *figs. 56* and *57*, wine flagon and incensory; *fig. 58^a* and *b*, iron and wooden chairs of the ninth and tenth centuries; *fig. 59*, writing-desk; *fig. 60*, Norman chair; *fig. 61*, royal chair; *fig. 62*, a table; and *fig. 63*, praying desk.

Pl. 23, fig. 2, travelling litter of a Frankish king of the eighth century borne by two horses; *fig. 1*, wagon bearing a sick or wounded prince of the thirteenth century.

In surveying the civilization of the middle ages, we find Roman demoralization on the one hand, and Asiatic and Germanic barbarism on the other. Not one city was spared by the destructive Asiatic hordes under Attila, and though all German tribes did not equal them in rapacity, still the name of Vandal has become proverbially infamous as a term expressive of every attack upon refinement.

In the West, arts and sciences, trade, &c., were still in their infancy, but agriculture soon became the tie which, in the new realms, attached to the soil. It cannot be denied that the agriculturists suffered as bondmen, but on the other hand there sprang up in the flourishing cities a powerful middle class, holding rank between a warlike nobility and the degraded serfs and rustics. By degrees, as wants began to be felt, labor was lightened by useful inventions, wealth was acquired, and a feeling of dignity roused, but with it a desire for greater liberty.

The influence of the clergy kept pace with temporal progress. They soon constituted the first and most powerful rank in the social scale.

War furnished an exhilarating excitement to the nobility, and, for want of external wars, they frequently came in conflict with cities and boroughs, and quarrels occasionally arose between neighboring barons and lords. In this way the laws of physical force usurped the province of right and justice, and the aristocracy did not hesitate to participate in robbing travelling merchants and tradesmen, and laying heavy taxes on them.

The ruling princes often needed the assistance of their barons in suppressing external foes; so they could ill afford to arrest the reign of club-law.

Arts and learning had taken up their abode with the clergy, though they were poorly enough represented among them, at least in Germany. In the latter part of the middle ages great progress was made in the fine arts, sciences, and trades. Though convents and seminaries were as yet the only abodes of learning, yet in the 12th and 13th centuries there were erected universities and other colleges, which increased rapidly in number and consideration. The university of Bologna was celebrated as a law-school, that of Salerno boasted of its professors in medicine. Other cities vied with each other in the erection and embellishment of these institutions. Those of Oxford, Paris, and Cambridge, were founded about 1200; Naples, 1226; Toulouse, 1228; Salamanca, 1240; Lisbon, 1290; Rome, 1313; Prague, 1349; Vienna, 1365; Heidelberg, 1386; Leipsic, 1409; Upsala, 1476; Tübingen, 1447; and Copenhagen, 1479. The Arabs, too, had their schools in Bagdad, Bassora, Cairo, Alexandria, Fez, Morocco, Sevilla. Granada, and especially in Cordova. So the Jews erected schools at Tiberias and Babylon.

As the cities and towns of Europe grew more independent, they enlarged their privileges, made laws for themselves, and even formed confederations among each other. Such were the *Hernandad* in Spain, the Lombard Union in Upper Italy, and the Hanseatic League in Germany. Yet quarrels were inevitable, sometimes with the patricians or nobility, at others with the guilds and corporations, and the disputes would often terminate in blood-

shed. The nobility generally devoted themselves to warfare, hunting, and chivalrous exploits, and continued to form the standing army of their feudal lord and master.

When gunpowder was invented, and its terrible explosive power had indicated it as an instrument of warfare (1354), the nobility preferred to contribute by money towards the pay of mercenaries to engaging in war themselves. Thus standing armies of paid and disciplined men, mostly foot-soldiers, were formed, though they retained for a long while the spear, bow, arrow, and crossbow, as their chief arms.

Just as gunpowder effected a revolution in the art of warfare, so the invention of the art of printing brought about a great change in literature, 1440.

CHIVALRY. ORDER OF KNIGHTHOOD.

Among the Germans, as among nations generally, the army consisted mainly of infantry; a small portion were horsemen. The latter wore a cumbrous armor. A weighty helmet pressed the head, the body was invested in a powerful coat of mail, metallic greaves protected the arms and legs, while the weapons consisted of the ponderous lance and sword.

As such an equipment involved a large expenditure, none but the noble and wealthy could afford to wear it, so that this branch of the service soon won great consideration. The nobility stood apart from all the other orders of society, who served only on foot. With the view of maintaining their distinguished position, the nobility devoted their lives almost entirely to exercises calculated to increase the physical powers, render the body superior to the effects of fatigue, and thus to make themselves superior warriors, whilst little or nothing was done for the cultivation of the mind. In early boyhood the nobles learned to curb a steed and to manage lance and sword. Before the invention of gunpowder, activity and strength alone could decide a contest. The knights, clad in armor from head to foot, and trained to combat from early youth, had naturally great advantages over all other combatants. They were regarded as the pride and flower of an army, its efficiency being in general proportionate to their numbers; and from their service, which was always performed on horseback, they received the name of chevalier.

We find the mention of knights as early as the time of Charlemagne; nay, Tacitus adverts to a similar order among the ancient Germans. It is only in the eleventh century, however, that we meet with the knight as vassal, performing the duties imposed upon him by feudal law, either alone or accompanied by his men. In his seventh year the boy was committed to the care of a male teacher. Very frequently he was placed in the castle of some other knight, where he was taught the rudiments of chivalry by serving his master in the capacity of page, and by respectful intercourse with noble ladies. He attended his lord or lady in the chase, on journeys, during a ride, or on a visit. He carried their messages for them, waited at table,

and acted as cup-bearer. His remaining time was occupied in gymnastic training, together with a very limited instruction in religion. On all occasions care was taken to impress him with a love of chivalry, and the most ardent veneration for the gentler sex.

Having reached his fourteenth year, he was armed with a sword, and elevated to the rank of squire. Thenceforth practice at arms, acquisition of knowledge of tactics, and of weapons and chivalrous pursuits, prepared the squire for his future dignity of knight. He accompanied his master in battle, and if he showed faithful attachment to him, if, above all, he succeeded in saving him from danger, sword in hand, and at the hazard of his own life, his glorious reward was that of being pointed out as a brave and noble youth.

When the squire had attained his twenty-first year he could claim the honor of knighthood. Occasionally that rank was conferred at an earlier age, provided the squire had obtained a prize in a contest with light arms, or had performed any remarkable feat of courage in the games which the squires celebrated on the day previous to a tournament.

The preparation for this ceremony consisted in fasting, nightly prayers, with a priest and godfather, in a church or chapel, penance and bathing, the whole concluding with the sacrament of the Holy Supper. These preliminaries over, he proceeded to the church, dressed in simple, generally white clothing, with his sword fastened to his shoulder, approached the altar, when the priest consecrated his sword, and then knelt down at the feet of the count, duke, or prince, who was to dub him. None but a knight could assist at this ceremony. He was now asked whether his intentions in assuming this profession were perfectly pure; if he would always defend the weak and oppressed, and particularly the widows and orphans, and the fair sex; if he was steadfast in his regard for religion and for the honor of chivalry; and if he would ever maintain an unflinching love for the truth. After answering these questions in the affirmative, he took an oath to obey the statutes of the order; after which the other knights and the ladies, friends of the novice, gathered around, and commenced equipping him, first with his left spur, then the right; next came the greaves and coat of mail, and finally the sword.

At the conclusion of this service he again knelt before the officiating knight, who rose from his seat and conferred upon the candidate the order of knighthood, by applying three blows with a naked sword upon the neck or shoulders, or sometimes a gentle touch on the cheek, accompanying the strokes with the words, "In the name of God, St. Michael, and St. George, I confer upon thee the honor and dignity of knighthood. Be brave, bold, and true!"

The young knight now rose from his knees, and after being greeted with the fraternal kiss or salutation, he proceeded to take his helmet, shield, and lance, sprang into the saddle, oftentimes without touching the stirrup, and rode forth among the people.

The times usually selected for these ceremonies were the leading church festivals, coronations, celebrations of victories, and other holidays. They

mostly took place in churches or chapels, sometimes in halls of castles or court-yards of palaces; on special occasions, *e.g.* after a battle, they were performed in the open field.

During a period of actual war the chevalier was bound to follow the banner of his liege lord; if he was a lord himself, he would lead the array. In time of peace the knight frequently went to strange lands in quest of occasions of gaining instruction and experience. On these tours he visited castles and courts, attended ceremonies of investiture, took a ready share in tournaments or serious quarrels, protected the weak from injustice, enlarged the circle of his friends, greeted his brethren in arms, and signified his friendship by an exchange of weapons. He bore the title of a knight-errant, and was welcome wherever he went, until knight-errantry was disgraced by gross abuses.

THE JOUST, OR TOURNAMENT.

The tournaments offered another occasion for the display of knightly skill and valor, and an opportunity for the exercise of warlike weapons, even when there was no war. They consisted of a series of martial contests, and formed an important feature on occasions of festival at the castles of nobles, princes, and kings. The tournament is from the French *tourner*, to turn; it only became general in the middle of the twelfth century.

In the time of Conrad II., or Henry VI., the knights formed four tournament associations, or circles: the Rhenish, the Bavarian, the Suabian, and the Frankish; each of which was headed by a field-king, or judge of the tournament. Subsequently these circles were respectively divided into three branches, each under the control of a subordinate king-at-arms.

Those only were qualified for entering the lists who belonged to an old family of the nobility counting at least four knights among their ancestors, in France three; but the conditions were subsequently modified, so as to admit the more recent nobility. Still they excluded all persons whose circumstances obliged them to pursue any branch of business or trade, and who lived in cities; any one who had married into a rank beneath himself, together with the issue of such marriage to the third generation; all natural children; and, finally, all who had by unworthy conduct forfeited the honor of knighthood.

The qualifications for tourneying were tested by the following regulations: 1. The heralds exhibited a helmet and scutcheon, at the same time proclaiming the name of their owner; and if any one made objection to his honor, the points of opposition were reported to the master of ceremonies. 2. The knight recorded his name in a register, so that the freest investigation might at any time be instituted in regard to his ancestry. 3. A certificate from a field-king was made out for each knight after a tournament, and served not only himself, but also his posterity, as a testi-

mony of his qualifications for tournaments. 4. The applicant could rebut all charges against his honor by competent testimony.

Besides the stewards and heralds, beadles or overseers assisted in maintaining order. With thin long poles, or tipstaffs, they stood in the lists in order to separate the combatants when the contest grew serious, and to protect the one who was exposed to danger. Another class of servants kept the crowds in order, took care of lost arms and armor, &c. Ladies, too, had certain official duties to discharge. Every tournament association sent one married woman, one widow, and one maiden, who were present at the exhibition of arms. Others crowned the victorious knight with the prize; still others enjoyed the right of naming the time and place of the next tournament, though the stewards were generally left to decide those matters.

The ground for the contest was a large elliptical and inclosed area (called the lists), and openings were left at the ends for ingress and egress. At the sides were erected large galleries or stages, beautifully adorned with heraldic tapestry and insignia, and appropriated entirely to the ladies, princes, courtiers, and nobles.

On the evening previous to the real tournament, that of the squires took place. On the morning of the tournament the knights attended mass, and were then conducted to the lists in a body by heralds, and followed by their squires, all in full armor. Halting without the inclosure, the dress and armor of the knights were examined, and care was taken against any attempts to fasten their persons by straps, or other means, to the saddles. At a signal given by the sound of the trumpet the beadles cut the ropes of the lists, and the horses entered the circle. The contests commonly consisted of single combats, though sometimes whole companies fought against each other. The exercises opened by a passage at arms with short blunted spears, fastened by chains to the cuirass. A flourish from the trumpet proclaimed the close of this species of fight, and then commenced the joust of the sword. In this contest the chief object was to cut down the crest and other ornaments from the adversary's helmet.

Next came the contest with the blunted lance and the shield, as sole weapons of offence and defence. In fighting across the lists there was a kind of barrier between the combatants, and they were required to meet each other at full speed. Whoever struck his adversary so forcibly as to unhorse him or to break his lance, had won a point, and the knight gaining the greatest number of points bore off the prize. The close of the games was followed by the heralds announcing the names and dignities of the victors, whereupon the prizes were distributed by the ladies who had been elected for the purpose. The prizes consisted of splendid arms, shoulder knots, golden chains and bracelets, richly caparisoned horses, &c., &c. Blasts of trumpets and shouts of joy accompanied this ceremony, and the receiver had a right to claim a kiss from the lady who handed him the prize, and then to invite her to a dance. French ladies would offer their champions presents by way of encouragement or as a reward, both during and after the combat, such as scarfs, veils, bracelets,

locks of their hair, &c. At the conclusion of the tournament the knights were disarmed by the ladies, and after receiving magnificent clothing were led to the feast. A ball concluded the entertainment, the knights taking precedence according to their success during the exercises of the morning.

The last public tournament was held at Worms in 1487. The introduction of gunpowder as a material of warfare, and the cost attending the magnificent displays, caused these exercises to be abolished.

The carrousel took the place of the tournament, especially in France. It opened with a quadrille of horsemen, in bands of four to twelve knights, and commanded by a leader. Next followed the *quintaine*. The game consisted in marking a point on a tree or pillar, which must be struck with a lance at full speed. Another form of the sport was afterwards introduced. Wooden figures were placed on pegs, so that they could turn round, and were to be hit in the face. Sometimes the figure to be struck was a Moor's or Turk's head. Another play consisted in striking off a ring placed upon the top of a pole. In all these sports the ladies presided and distributed the prizes.

The *judicial combat*, or the trial by the judgment of God, differed from the tournament. It proceeded upon the presumption that God would give success only to the party having a just cause. We find these contests among the German tribes as early as the sixth century, and they soon increased so much that laws were passed for their regulation. The leading features were, in the main points, the same as at the tournament. It may be observed, that before the combat took place the complainant had to swear to the truth of his accusation, and the defendant, with similar formality, to his innocence. Particular clothing and armor were worn by the contending parties; special judges enforced a strict compliance with the rules, and the combatants deposited with the officers a pledge sufficient to satisfy the victor. As such a pledge often consisted of a garment, it is not unlikely that the custom of throwing down the gauntlet in challenge originated in these pledges. The vanquished met with more or less severe punishment; and if he was sentenced to death, or fell in the conflict, he was denied the privilege of honorable burial, as the issue of the combat was thought to fasten the guilt of perjury on the conquered man. The laws exempted minors, the aged, the maimed, the sick, women, and the clergy, from this mode of trial, though any of these classes might employ others to fight for them.

From this custom, doubtless, originated the private duel and the code of honor, the first traces of which we meet with in France in 1250. It was in that country also that the last judicial combat took place in 1547.

Pl. 23, fig. 5, vassals offering their allegiance when admitted to the castle; *pl. 24, fig. 1*, Maximilian I. in full armor; *fig. 2*, Henry VIII. of England in full armor; *fig. 3*, an English knight; *fig. 4*, a German knight; *fig. 5*, squires; *fig. 6*, English knights as they appeared in the tournament; *fig. 7*, German knights before the tournament; *fig. 8*, king-at-arms, or judge. *Pl. 38, fig. 2*, view of a tournament in Germany. *Pl. 25, fig. 1* contest with the lance by German knights; *fig. 2*, judicial combat with

lances; *fig. 3*, contest with axe and mace in France; *fig. 4*, judicial combat with shields; *fig. 5*, the same with swords; *fig. 6*, the same with lance points; *fig. 7*, carrying the ring in the carrousel; *fig. 8*, squire taking the oath on the sword. *Pl. 26, fig. 2*, young knight at the altar, vowing to serve God, honor, and the ladies; *fig. 2*, ceremony of dubbing a knight. *Pl. 36, fig. 1*, French knights and ladies hawking.

HERALDRY.

The full suit of armor being entirely closed, left no trace by which the knight who wore it might be recognised. To obviate this difficulty special marks of distinction were introduced on different parts of the armor. They consisted of differently shaped and colored plumes on the helmet, of particular colors or forms of the sashes or shoulder knots, but most especially of various designs on the shields. These latter designs were worn by the descendants of the knights in commemoration of their ancestors; and thus originated the distinction of families by their coats of arms, which at first consisted only of the private mark or motto adopted by a knight for the decoration of his shield.

Heraldry is the science treating of the various coats of arms, which soon became manifold, partly by the combination of several family escutcheons by marriage, partly by being made indicative of the various possessions and dignities of the owner. Coats of arms were also bestowed by princes upon the nobility, upon cities and corporations.

The figures which ancient heroes engraved upon their shields, helmets, and other arms, were entirely arbitrary, each individual selecting such symbols and devices as best suited his fancy. About the tenth century, and certainly in the eleventh, these representations began to take certain fixed forms, though the fancy of the wearer still had an important share in determining the inscriptions. Among the uses to which these figures were applied, we may mention their aid in testing the claims of a knight at the tournaments, and in the crusades they were universally adopted in the Christian lands. In the progress of time the shield proper formed no necessary part of the armorial bearings, as the figures could as well be etched upon seals, &c. The classes of persons entitled to wear them were increased, the princes bestowing them as badges of honor on the learned bodies, philosophers, or artists; and families whose nobility was extinct retained their coats of arms.

So long as the armorial bearings indicated precisely the rank of the wearer, the rights of nobility were thereby discerned. The heralds before described were required to be quite familiar with the laws of heraldry, as it was their duty to ascertain and announce the rank, country, and dignity of the knights who signified their desire to take part in the tournaments. Heraldry first became a science in France, then in Germany, England, &c. Heraldic tables are still of vast importance, not merely to titled families, in order to establish their origin and rights, but also to

historians and antiquarians, and to such as wish to settle the degrees of consanguinity between relatives and families in lawsuits or other questions. Heraldry, in short, indicates a man's rank and family, collateral descent, and relationship by marriage, as the arms of the wife were combined with those of her husband. It establishes also the political or ecclesiastical power, residence and occupation, right of succession, and, finally, adoption, as in the last case the arms of the patron are united with those of the ward. Armorial designs belong (*a*) to individuals, as a lord-bishop; (*b*) to each branch of the family, hence family-arms; (*c*) to a republic or an association. Again, we meet with arms designating the sacred position of the wearer, or his authority, or some circumstance indicative of the occasion on which the dignity was conferred by the king; or, finally, armor of patronage and protection. When the names of the figures or symbols composed the name of the wearer, it was called denominational or titular armor; thus the Henneberg family emblazoned their shield with a black hen (*Henne*) on a green mountain (*Berg*).

The armorial shield usually contained various ornamental pieces, as the helmet, crown, cap, or hat; sometimes animals or men supported it, while in other cases pillars or insignia peculiar to military orders surmounted it. As marks of condition, it was also adorned with the globe of empire, sceptre, sword, crozier, or other accidental symbols.

The form of the armor was often national. Thus the French shield terminated below in two wave lines meeting each other (*pl. 27, fig. 10*), while the lower part of the Spanish shield is rounded (*fig. 11*). The German shield had several indentations (*fig. 8*), though originally it had but one (*fig. 1*). The prominent parts were often twined or ornamented. As the shape is not essential, the shield often takes a triangular (*fig. 2*) or heart form (*fig. 4*). The Knights of the Banner in France bore square shields (*fig. 13*), while the ladies selected the rhomboidal (*fig. 5*), or the heart-shaped (*fig. 4*). Scholars frequently adopted the French form in a slanting position (*fig. 6*). Many families had the shield crooked or inverted. When a man could claim several shields, they were grouped in a circle, placing the most honorable in the centre, and the others in accordance with their rank; but they might also be combined, and form the fields of one large shield. The science of heraldry regulated this arrangement, and the heralds at the tournaments, in announcing or blazoning the titles of a knight, mentioned first the central shield, and then proceeded from the right to the left, and from the top downwards.

The shield is generally divided into five principal *points*; the centre is called the heart or fess point; the top the head point, or precise middle chief; the point equally between the fess and chief was called the honor point; that at the foot the precise middle base; and that between the heart and base, the navel or nombril point.

If the shield contains several representations separated by lines, the portions of the shield thus set apart are termed fields (*pl. 27, fig. 53*), and when there are four equal divisions, as in *figs. 13, 29, and 53*, the shield is called quadripartite.

Sometimes shields are divided into three parts each way, exhibiting nine fields in three rows or charges, which are named as follows: the upper or chief charge, transverse middle charge, base charge, middle vertical charge, right vertical charge, and left vertical charge. This arrangement also determined the number and names of the fields or grounds; thus we find the terms middle chief, dexter chief, sinister chief; fess, with its dexter and sinister; and middle base, with its like grounds. When there are five rows they may be called: row of the head point, honor-point, fess-point, navel-point, and base. If the horizontal division be interrupted, then the longitudinal decides. One or several vertical fields are called a pale. When a pannel in the middle base presents two curve lines pointing upwards it is said to be engrafted; and engrafted pannels may also occur in the centre of the escutcheon, and even in three different rows.

The lines have several directions on the face of the shield, as the perpendicular, the transverse, the oblique, from dexter chief to sinister base, and from sinister chief to dexter base.

The helmet, with its decorations (or in place of the helmet, the crown, cap, or hat) surmounting the fields, is called upper shield. The helmet was properly the designation of knightly dignity; and although but one helmet usually was placed on a shield, yet the number might be increased according to circumstances, and the two external helmets were occasionally worn by the shield-bearers. The helmet, and when several were used, the middle one, is commonly represented looking straight forward, as in *pl. 27, figs. 87 and 90*; occasionally it appears turned aside, as in *fig. 91*. The other helmets always look to the centre. The armorial helmet is either open or closed, sometimes entirely open, with bows, *figs. 87, 90, 92*. In the latter case, the more numerous the bows the more distinguished was the family to whom the arms belonged; so it was, at least, in France. The closed helmet has properly none but the slightest openings, *fig. 88*. Kings universally wore the casque freely open, the higher nobility partly open, with bows, the lower dignitaries had it almost entirely closed. Open helmets were also called tournament helmets, being worn by those who might claim admission to the lists. Crowned heads sometimes adopted indifferently the closed or the helmet with bows. The casque usually supported jewels, strings of pearls, or chains adorned by pendants; and it was frequently marked by foliated impressions, tastefully finished with gold and silver mountings. These were called helmet coverings, and the colors indicated that of the lining. Sometimes a crown surmounted the decorations. The crown, however, was not indicative of any regal or imperial power. It consisted of a ring fitted to the head, set with stones, and further adorned with four rosettes, between every two of which was a pearl. In other cases, a wreath supplied the place of the crown, and took a variety of names according to the number of ribands and jewels employed in its construction. These helmet coverings only served to support figures attached to the helmet, and called helmet ornaments or gems, and which were mostly repetitions of a figure or emblem worn in the shield. Such emblems were, for instance, wings of eagles, a pair of which was termed a flight, open, if

extended in front, and closed, if seen from one side. The flight itself was often decorated by other figures. Lions, eagles, and other animals; heads of men and beasts, talons and beaks of birds, claws of animals, a man's arm, the hand grasping some object, horns of the buffalo, antlers of the deer, banners, fans, screens, mirrors, &c., &c., were also decorations of helmets. Certain classes of objects showed the rank of the party; thus the hat, cap, mitre, sceptre, globe of empire, and the upper part of a human body, male or female, which was termed a doll. The most common animals were the stag, unicorn, and birds of prey. It was always deemed necessary that the figures should occupy an upright position, and proceed from the crown.

Instead of the helmet, any other mark of distinction, and especially the crown, might occupy the highest position upon the armorial bearings. The rim or circle constitutes the most significant portion of the crown. It forms the basis on which rest the various ornaments, as rays, arches, rosettes, pearls, stones, lines, crosses, &c., all of which are mere ornaments, but serve at the same time as certain distinctions in the coat of arms. The same is the case with the four, six, or eight bows or arches, which sometimes are attached to the upper edge of the band, and unite in the centre, where they support a globe of empire, lily, cross, lion, or eagle. The outer faces of the bows are richly studded with pearls, and in some crowns they rest upon a rich lining. This is particularly the case in the English crown, the arches of which are also bordered with ermine. In all cases the crown is of gold, and the pearls and stones preserve their natural color.

The imperial crown appears in several German coats of arms, and is represented as consisting of eight plates of gold, rounded at the top and decorated with jewels and insignia, the front plate sustaining a cross, and a bow extending from the rear to the cross (*pl. 22, fig. 31*, Charlemagne's crown).

The modern German crown is of regal shape, with four leaves and three broad bows. A rich cap underlies the jewelled part, and from the right and left sides are suspended two broad ribands. The globe of empire rests upon the summit (*pl. 28, fig. 2*).

The Russian imperial crown (*fig. 1*) has the cap beneath; and the Hungarian crown is high, and not only lined, but richly set with pearls, and bears images of saints. In the crown of the Grand Duke of Tuscany there are several notches, and it is unlined.

The tiara, or pope's crown (*pl. 27, fig. 83*), consists of a high cap, divided into three equal compartments by three crown rims, adorned with leaves and surmounted by the globe of empire.

On all the German royal and arch-ducal crowns are eight leaves on the rim and four or eight bows (*pl. 27, figs. 67-76*); the crowns of the marquises, counts, viscounts, barons, and lords, are without bows (*figs. 80, 81, 82*). The crowns of the viscounts contain several pearls, those of the barons have only a few, while those of the lords have merely a rim, round which is wound a string of pearls. Electoral princes wear crowns edged with ermine, and surmounted by the globe and cross, or simply by a tuft

of ermine. Sometimes four rows of pearls extend from the rim of ermine to the top of the crown (*figs. 77, 78, 79*).

The bishop's hat, or *infula* (*fig. 84*), consists of a high cap, composed of two broad leaves, tapering towards the top, and embellished with pearls or jewels. From both sides, as in the pope's tiara, broad ribands are suspended. In the *infula* of English bishops the two broad leaves are supported by a crown rim. Catholic prelates wear a low hat, with wide upturned rim, and two pendent tassels, one on either side.

The color of the hat and the number of tassels indicate the difference in rank and dignity. The cardinal's hat is red, and carries now fifteen tassels on either side, *fig. 85*. In some Catholic countries the cardinal exhibits in his escutcheon a princely hat, and even a crown below the cardinal's hat, but at Rome this is not permitted. In Spain and France the archbishops show a green hat with ten tassels, the bishops one with six tassels, while the prothonotary is known by a black hat with three violet blue tassels.

Since the Congress of Vienna the right of showing the regal crown belongs not only to kings and grand-dukes, but also to other ruling princes. Princes of the blood in some countries adopt crowns of a prescribed form; in others, they follow the style peculiar to their dynasty.

The globe of empire originated in this way: Pope Benedict VIII. presented to the Emperor Henry II. a small globe surmounted by a cross, meaning it not merely as a part of his royal insignia, but also as a symbol of the power of the cross over the world. Later it became an emblem of imperial authority. Free cities received it in their armorial designs as a mark of imperial favor; soon after kings and princes adopted it to signify their power as Christian rulers.

As the successor of the Apostle Peter, the pope incorporates in his arms the figure of two keys crossing each other. Bishops and abbots marshal behind the shield, and leaning obliquely on the left side, a crook or crozier, as emblematical of their office as pastors over the flock of Christ; and in case the incumbent is at the same time invested with civil authority, the other side presents the figure of a sword. The arms of an abbeſs show no *infula*; but in lieu of it, the staff or crozier in the middle, behind the shield.

In France the marshals show two marshals' staves; admirals two anchors; and the lord chamberlain two keys, which must be of a shape different from that of the pope's keys.

The imperial or double-headed eagle bears the arms on its breast, and holds in one talon the sceptre and sword, in the other the imperial globe. In the Russian imperial arms there are three subordinate shields on each wing; and the German arms of the imperial house show five additional shields upon the tail.

Frequently the shield and the shield-holders rest upon some basis, as a floor or a ribbon, on which mottoes are placed.

The colors or hues of the shields were the principal mark of distinction between the chevaliers, and are, therefore, still minutely determined when a coat of arms is conferred. They are termed *tinctures*, as, for example, those designated by the metals, gold, silver, and iron, and the colors proper, red,

blue, green, and black. Yellow and white were not employed as tinctures, but represent gold and silver. Purple, as approaching to red, and violet as a combination of red and blue, are used ; and in England, also the blood red, and the orange or tenny, a mixture of yellow and red. If, as in copperplate engravings, woodcuts, &c., the actual colors were not put on, it was once customary to express them by their initials, G. S. I. Gr. B. Bl. R. ; or by planetary symbols (*pl.* 27, *figs.* 14–20). At a later period they were indicated by dots and lines, thus : gold was expressed by dots (*fig.* 14) ; silver by a plain surface, without dots or lines (*fig.* 15) ; red by perpendicular lines (*fig.* 16) ; blue by horizontal lines (*fig.* 17) ; green by diagonal lines, from left to right (*fig.* 19) ; purple by the reverse of green (*fig.* 20) ; black by the intersection of horizontal and perpendicular lines (*fig.* 18) ; iron, by diagonal lines crossing each other (*fig.* 21). Blood red was expressed in the same manner as iron ; and the tenny by perpendicular lines, intersected by left diagonal ones.

Metals must always alternate with colors ; a figure of metal must be painted on color, and a colored figure on metal. The coverings and figures belonging to the helmet also follow this rule ; but the color of purple forms an exception. Other exceptions also are found, *e. g.* when a figure is intended to retain its natural color ; or when the ground of a field may have at the same time both metal and color, and the figure extends over both ; or when the figure is to mark a peculiar branch of an old or extinct family ; or lastly, when the same figure has a portion of itself varying in color from the rest, as in the red tongue of an animal.

False arms are such as do not follow these rules. They are also called enigmatical, because they contain a proposition to be solved. Thus the arms of the king of Prussia contain a red griffin, as a metaphor of the duchy of Stettin.

The figures of a shield are partly mere combinations of tinctures, partly actual images. The former class are termed honor pieces, and consist of crosses, arches, beams, triangles, spars, &c. (two oblique beams united, *pl.* 29, *fig.* 25), few of them having any actual meaning. A shield is called vacant when it bears only tintured fields of equal size, and without figures (*fig.* 34).

In addition to the right-lined and curvilinear division of the tinctures, we find the following shapes of honor pieces : checker work, battlements, stairs, scales arranged in various ways, swallow-tails, crutches, crosses, &c., &c. A shield is said to be expectant when it contains merely fields or tinctures upon which figures may be inserted, as circumstances may suggest. Vacant shields, which are embellished upon their surfaces with lines, are termed damasked. If two different tinctures meet in a point in the middle of a field, the field is said to be diagonally quartered (*fig.* 54). If two tinctures change in a square, the field is quartered (*fig.* 53), and the position may be either straight or oblique ; if straight, the field is checkered (*fig.* 31), if oblique, the checkering of course is lozenged (*fig.* 32). Other fields are graded, greaved, netted, and alternated, as the seams of a wall. The trellis or grate is formed of lines crossing each other at either right or

obtuse angles. A neat variation of tincture is in the small iron hats, which resemble and have been interpreted as furs, but which actually represented the iron hats of the knights (*figs.* 26–28). They had the form of small pointed spires or cones. Sometimes, however, ermine is represented upon shields; when the ground is black and the points white it is called counter ermine.

On the same field of an honor-piece various figures may be found opposite, beside, and even upon each other, *e.g.* beams and rafters, or piles, spars or beams, with diamonds, rings, or coins, upon them. The cross occurs in a great variety of shapes, and is considered an honor-piece.

In regard to the form of the shield, nothing is essential. Thus we have, *pl.* 27, *fig.* 1, the crescent-shaped; *fig.* 2, the triangular; *fig.* 3, the fancy form; *fig.* 4, the heart form, usually adopted by ladies; *fig.* 5, the diamond; *fig.* 6, the reclining; *figs.* 7, 8, forms of ancient shields; *fig.* 9, German shield; *fig.* 10, French; *fig.* 11, Spanish; *fig.* 12, Italian; *fig.* 13, ensign or banner shield. In addition to the description of the representation of colors already given, we call attention to *fig.* 22, which indicates natural colors, *e.g.* the horse; *fig.* 23, ermine; *fig.* 24, counter ermine; *fig.* 25, spotted; *fig.* 26, small blue and white hats; *fig.* 27, red and yellow hats; *fig.* 28, irregular blue and white hats; *fig.* 29, fur; *fig.* 30, greaved or scaly. The division of shields is as follows: *fig.* 33, vertical; *fig.* 34, horizontal; *fig.* 35, diagonal left; *fig.* 36, diagonal right; *fig.* 37, right indented; *fig.* 38, left indented; *fig.* 39, horizontal indented; *fig.* 40, vertical indented; *fig.* 41, vertical left; *fig.* 42, vertical right; *fig.* 43, vertical triple; *fig.* 44, horizontal triple; *fig.* 45, diagonal left triple; *fig.* 46, diagonal right triple; *fig.* 47, superior angular; *fig.* 48, inferior angular; *fig.* 49, vertical stripe; *fig.* 50, horizontal stripe; *fig.* 51, diagonal left stripe; *fig.* 52, diagonal right stripe; *fig.* 53, quartered shield; *fig.* 54, diagonal quartered; *fig.* 55, upward rafters; *fig.* 56, downward rafters; *fig.* 57, cross; *fig.* 58, oblique cross; *fig.* 59, advanced shield; *fig.* 60, enigmatical shield; *fig.* 61, expressive shield; *fig.* 62, covered shield; *fig.* 63, shield supporting a small shield.

On the same plate will be found representations of the principal European crowns; *fig.* 64, ancient German imperial; *fig.* 65, Russian imperial; *fig.* 66, Turkish imperial; *fig.* 67, English; *fig.* 68, French; *fig.* 69, Spanish; *fig.* 70, Prussian; *fig.* 71, Swedish; *fig.* 72, Danish; *fig.* 73, Sardinian; *fig.* 74, Hungarian; *fig.* 75, Scottish; *fig.* 76, grand ducal crown; *fig.* 77, crown of an electoral prince; *fig.* 78, crown of a prince of the blood; *fig.* 79, ducal crown; *fig.* 80, count's; *fig.* 81, viscount's; *fig.* 82, baron's; *fig.* 83, bishop's; *fig.* 84, papal crown; *fig.* 85, cardinal's hat; *fig.* 86, hat of the doge of Venice; *figs.* 87–92, helmets of arms.

We close the whole subject with a list of the coats of arms belonging to the princes and some of the noble families. *Pl.* 28, *fig.* 1, Russian imperial; *fig.* 2, Austrian imperial; *fig.* 3, British royal; *fig.* 4, late royal French; *fig.* 5, royal Belgian; *fig.* 6, royal arms of the Netherlands; *fig.* 7, royal Swedish; *fig.* 8, royal Danish; *fig.* 9, royal Spanish; *fig.* 10, royal Portuguese; *fig.* 11, royal Sardinian; *fig.* 12, royal Sicilian; *fig.* 13,

pontifical; *fig. 14*, royal Grecian; *fig. 15*, grand duchy of Tuscany; *fig. 16*, duchy of Modena; *fig. 17*, duchy of Lucca; *fig. 18*, Baron von Seckendorf; *fig. 19*, Baron von Fahrenberg; *fig. 20*, Baron of Brussels; *fig. 21*, Cotta von Cottendorf. *Pl. 29, fig. 1*, royal Prussian; *fig. 2*, royal Bavarian; *fig. 3*, royal Saxon; *fig. 4*, royal Hanoverian; *fig. 5*, royal Württembergian; *fig. 6*, grand duchy of Baden; *fig. 7*, electorate of Hesse; *fig. 8*, grand duchy of Hesse Darmstadt; *fig. 9*, grand duchy of Saxe-Weimar-Eisenach; *fig. 10*, duchy of Saxe Meiningen; *fig. 11*, duchy of Saxe-Altenburg; *fig. 12*, duchy of Saxe-Coburg-Gotha; *fig. 13*, duchy of Brunswick; *fig. 14*, duchy of Nassau; *fig. 15*, grand duchy of Mecklenburg; *fig. 16*, grand duchy of Oldenburg; *fig. 17*, duchy of Anhalt Dessau; *fig. 18*, duchy of Anhalt Bernburg; *fig. 19*, duchy of Anhalt-Köthen; *fig. 20*, principality of Schwartzburg; *fig. 21*, principality of Hohenzollern Hechingen; *fig. 22*, principality of Hohenzollern Sigmaringen; *fig. 23*, principality of Waldeck; *fig. 24*, principality of Reuss; *fig. 25*, principality of Lippe Schaumburg; *fig. 26*, principality of Lippe-Detmold; *fig. 27*, principality of Liechtenstein; *fig. 28*, landgrave of Hesse-Homburg; *fig. 29*, duchy of Parma; *fig. 30*, Prince Esterhazy; *fig. 31*, Prince Metternich.

THE CLERGY AND THEIR INFLUENCE.

In the middle ages the Christian religion gradually and constantly progressed. It was adopted among the German, Slavonic, and Scandinavian nations, in Russia and Hungary, and even among some of the Tartar hordes of Asia. But its original purity soon became dimmed; and its spirituality and simplicity were often lost amid the gorgeousness of imposing ceremonies. The doctrines of the cross were loaded with human inventions, by which the church was brought to disunion and endless controversy.

Three great sections of the Christian church appear but a few centuries after its organization.

1. *The Roman Catholic Church.* This branch has its sovereign head at Rome, in the person of the pope. In addition to the Bible, it recognises the authority of tradition. It regards the decrees of synods and of bishops as necessary to the maintenance of truth and unity. The church believes in the doctrine of extraordinary merit, especially in works of supererogation in the saints, in the power of their intercession, and in indulgences. Another doctrine prominently set forth is that of purgatory. The standards of the church teach seven sacraments: baptism, the Lord's supper, confirmation, penance or confession, ordination of priests, matrimony, and extreme unction. In the sacrament of the Lord's supper the Catholic church holds the doctrine of transubstantiation, *i.e.* that through the force of the words of institution, pronounced by the officiating priest, the essential nature of the bread and wine is changed into the substance of the body and blood of Christ; and holding at the same time that the reception of the body

includes that of the blood, it excludes the laity from the use of the cup. Regarding the supper in the specific form of the mass as an efficacious offering or sacrifice, beneficial to the dead as well as the living, the priests perform mass for the repose of departed souls.

2. *The Greek Church*, which was entirely separated from the Roman in 1054, is under the control of patriarchs. It is not unanimous on some questions of importance; thus one party still regards the pope as the supreme head of the universal church, while another rejects all belief in the necessity of this supremacy. Both, however, acknowledge as the rule of faith the Bible, the writings of the apostolical fathers, and the decrees of the seven councils. They believe that the Holy Ghost proceeds from the Father only. They also ascribe a meritorious efficacy to good works, especially fasting, charity, almsgiving, and monastic life; but they deny the doctrine of purgatory, and condemn the practice of granting indulgences. In regard to the souls of the departed, they believe in a middle state, where the pious souls calmly await the day of judgment, and the wicked in terror and anguish look forward to the day when their punishment is to commence, unless the intercession of the priests delivers them from their torment. This church, too, recognises the seven sacraments. The sacrament of the Lord's supper is administered to the communicants in the form of cylindrical pieces of leavened bread, dipped in wine, so that they receive both bread and wine.

3. *The Armenian Church*. (*Pl. 32, figs. 5, 6*, Armenian patriarch and monk.) The supreme authority of this church is vested in the Catholicos of all Armenians, under whom rank several patriarchs. She rejects the veneration of images. She sees in Christ only one nature, the divine, like the Jacobite and Coptic sects.

The Mennonites and Maronites in Syria (*figs. 3 and 4*, Maronite patriarch and monk) confess in Christ one person, but two natures, actuated by one will.

The vestments of a Roman Catholic bishop consist of the pontifical shoes and stockings, the cross upon the breast, the tunic, the dalmatica or alba, the finger ring, the mitre or infula, the crozier, the mantle (*pallium*), the gloves, the orale (a veil, covering the shoulders and breast), and the *præcinctorium*. (*Pl. 32, fig. 1*, St. Augustine in full canonicals; *fig. 2*, St. Anthony.) In the pope's dress the chief distinction is the triple crown. The customary official costume of the priest embraces the *amictus*, the white linen shirt, the *alba*, the girdle, the rochette (a species of white linen gown or cassock, with closed sleeves); the *stola* (a broad sash worn by the priests around the neck, and crossed upon the breast; the deacons, however, usually place it across the left shoulder), and, finally, the dress for performing the offering of the mass. The priests also place upon their heads a low quadrangular cap.

The practice of monastic seclusion rose to its height during the middle ages. Its commencement probably dates back to the time of the early Christians, who, to preserve their lives from the fearful storms of persecution, betook themselves to the mountains and deserts, where they passed their days in con-

temple and prayer. The leading Scriptural authority for the institution is founded in the remark of Christ to the young man who inquired the way of eternal life: "One thing thou lackest. Go thy way, sell whatsoever thou hast, and give to the poor, and thou shalt have treasure in heaven; and come, take up the cross, and follow me." These words many applied to themselves; and renouncing all earthly and worldly goods, they sought an undisturbed tranquillity where they might devote themselves to prayer and meditation, whilst they mortified their flesh.

Such persons received the names of recluses, anchorites, or *hermits* (from ἔρημος, *waste, desert*), and subsequently *monks* (from μόνος and μονάχος, *solitary, alone*). Their quiet contemplative life offered strong inducements to imitation, and the numbers at length increased to such an extent that they united in associations. Their common residence, inclosed with hedges or walls, was called cloister (from *claustrum*, an inclosure). The superior took the title of abbot, from the Syriac *abba*, signifying father. Women and young girls formed themselves into similar societies, and called themselves nuns, an Egyptian word meaning mother. The cloisters probably originated in the fourth century, but their number was increased in every coming century. *Pl.* 32, *fig.* 8, Greek monk of Poland; *fig.* 9, Jacobite monk.

After the sixth century the monks began to act in accordance with fixed rules, though as early as the year 350, St. Basil (*pl.* 32, *fig.* 7) of Neo-Cæsarea drew up a system of regulations for the use of both monks and nuns. These rules were especially spread in the East, and are still observed in all convents of the Greek church, as well as by the Basilians in Spain and Sicily. On the plan of St. Basil the monks and nuns were required to observe chastity, obedience to the superior, prayers at regular hours, long continued fasts, and to live mainly upon a vegetable diet.

About the beginning of the sixth century, St. Benedict of Norcia reformed the whole system of monachism in the west. As a pious and judicious leader of an order, he built a cloister on Mount Cassino, near Naples, and the regulations which he established in his society proved so successful that they came to be generally adopted in all similar institutions of the west. He made the cloisters the abode of piety, temperance, and industry; and during those lawless and revolutionary times they became the retreat of philosophy and literature. Benedict, considering the wants of the times, abolished the severe fasts and the constantly repeated prayers, and persuaded the monks to work, and thus to render themselves of service to the community in which they lived. His society, known in history as the Benedictines, pledged themselves to obedience to the canons, to an unconditional submission to the superior, to a constant monastic life, to uniform and settled hours for prayers and secular duties, to the observance of an inviolable chastity, and to the entire relinquishment of all worldly pleasures. In place of the white dress adopted by the order of St. Basil, the Benedictines wore a black cowl. *Pl.* 32, *figs.* 10, 11, Benedictine monk and nun.

In the course of time the original discipline was gradually relaxed. To

some enthusiastic members of the order, however, it did not seem severe enough, and consequently the rigidity of the rules was increased, and new additions made, so that among different societies called by the same name it was often difficult to trace even a dim resemblance. Thus arose the order of the *Clugnyacensians*, founded by St. Oden of Clugny; the *Congregation of Mount Cassino*, ordained 1408, by St. Justinus at Padua and Mount Cassino; the *Congregation of St. Maurus*, established by St. Maurus, in France, 1621 (*pl. 33, fig. 27*, a monk of this Congregation); the *Calmalduensians*, founded by St. Romoald between 960 and 1009, at Campo Maldoni, near Milan (*pl. 32, fig. 19*, a monk of this society); the *Sylvestrinians*, founded by Sylvester Gozzolan of Ancona (*pl. 32, fig. 25*, the general of the Sylvestrinians); the *Grammontensians* (grand mountaineers), founded by St. Stephen of Thiers, on Grandmont, near Limoges, 1076; and the *Carthusians*, whose founder was St. Bruno, 1086, a pious monk of Rheims. Owing to the great dissipation prevalent in those times, he was induced to seek solitude. St. Bruno betook himself, with a few congenial friends, to a narrow and desolate valley, called Chartreuse, lying between two precipitous rocks, covered with snow and bramble, and not far from Grenoble. In this dreary spot he erected a cloister, where the emaciated monks lived in the deepest poverty. Their regulations were of the most stringent character; even conversation at times was prohibited (*fig. 18*, Carthusian nun in her dress preparatory to confirmation). We mention also the *Celestines*, founded by Peter di Mardone, 1264, afterwards Pope Celestine V. (*pl. 33, fig. 2*, Celestine monk); the *Cisterians*, established 1075, by twenty-one monks, who, led by their abbot Robert, had emigrated to Cisternum. Out of these, in the way of further reformation, sprang the *Bernardines*, by St. Bernard, abbot of Clairvaux, in the beginning of the twelfth century (*pl. 32, fig. 21*, Bernardine nun). To these may yet be added the *Feuillans*, established 1580, by John de la Barrière, prior of the abbey of Feuillans, near Toulouse (*pl. 33, figs. 25 and 26*, monk and nun of this order;); the *order of Frontevrault*, founded by Robert of Arbrissel in the beginning of the twelfth century (*pl. 32, fig. 12*, Frontevrault nun); the *Congregation of Port Royal*, founded for nuns, 1204; and the *Monks of la Trappe*, in Normandy (*pl. 34, fig. 7*, monk of la Trappe), founded by Rotrou, count of Perche.

The rules adopted by St. Augustine bore a strong similarity to those of the Benedictines. Indeed, his were not monastic regulations proper, but rules for the clergy of his diocese, binding them to poverty, chastity, common prayers, &c., without constituting them an order. The congregations of canons and prebendaries adopted his rules without forming monasteries. Among them were the canons of the *Lateran* (*pl. 32, fig. 15*), those of the Holy Sepulchre (*pl. 33, fig. 1*), those of St. Salvator, St. Genevieve, St. Rufin, and the Hospitalers generally.

These rules were later adopted by monks also, and thus was formed the *Order of Augustines*, consisting of hermits united into one body in the year 1256, by Pope Alexander IV. At a later period Augustine nunneries were established (*pl. 32, figs. 13, 14*, Augustine monk and nun). Following the Augustines, arose the *Præmonstrants*, founded by St. Norbert, in the

north of France, 1220; the *Servites*, by Monaldi, near Florence, 1223; the *Jeromites*, who were divided into *Hermits of St. Jerome of Spain* and *Hermits of St. Jerome of the Observance*, 1429, the *Congregation of Peter Gambretti*, 1337, and *Hermits of St. Jerome of Fiesole*, 1360. Other classes of Augustine monks were, the *Jesuates*, founded by John of Columbino; the *Brigitines*, founded by St. Brigitta, 1344, at Western, near Lynköping, in Sweden; the *Carmelites*, founded in 1208, by Albert, Patriarch of Jerusalem, and divided into two branches, the barefoot and the shod. *Pl. 32, fig. 16*, barefoot Carmelite in his mantle; *fig. 17*, Carmelite nun in her surplice.

After the twelfth century various religious orders were formed, who, not satisfied with the secluded and inactive life of the cloister, sought to extend the sphere of their usefulness beyond its walls. The first among these were the *Trinitarians* or *Mathurines* (order of Mercy), who were established, in 1198, by John of Malta and Felix of Wales. The institution was dedicated to the Trinity, and devoted itself, among other objects, to the liberation of Christian slaves. Soon after, the Roman see established the orders of the *Mendicants*, or *begging friars*, who were to prevent the increase of knowledge. The pope conferred upon them the most important privileges, *e.g.* exemption from all civil and ecclesiastical jurisdiction, permission to preach and collect alms, hear confessions, perform masses, and sell indulgences everywhere. In form, their constitution was a military one, the superiors exacting strict subordination and discipline from the subalterns, and aiming at the elevation and grandeur of the hierarchy. The two great branches of this society were:

1. The *Dominicans* (Jacobins, Evangelists, Mendicants), founded in 1212 by St. Dominicus, at first an order of ecclesiastics or preachers, but afterwards commissioned with maintaining the Inquisition. They adopted the rules of St. Augustine. *Pl. 32, fig. 26*, Dominican monk; *fig. 27*, Dominican nun.

2. The *Franciscans* (Cordeliers, Minorites, *Fratres minores*, &c.), founded by St. Francis of Assisi, in the beginning of the thirteenth century. They assumed a variety of names, according to their objects and condition: the *Barefoot* (*Soccolanti*), who were again subdivided into the *Organized Franciscans* (Cordeliers, Observantines), the *Austere* (*Reformati*, *Recollecti*, &c.), and *Most Austere* (*Alcantarines*, &c.); and the *Covered or Shod Franciscans* (*Conventuales*), to whom belong the *Capuchins*, established at Florence in 1525, by Matthias of Bassi, and afterwards many others. This order also embraced the *Cæsarines*, *Celestines*, *Spirituales*, *Clarentines*, *Fratricelli*, and *Minimes*, the latter having been founded in Calabria, in 1435, by Francis of Paula. *Pl. 32, fig. 22*, Capuchin monk in his mantle; *fig. 23*, the same going to officiate at mass in Rome; *pl. 33, fig. 3*, a Minime: *fig. 15*, a Franciscan nun of the order of St. Elizabeth.

At the period of the Reformation these various societies attracted peculiar attention, and many of them could not pass the examination to which they were subjected in order to test their usefulness. Some orders, therefore, embraced new objects, the members devoting themselves to attendance upon the sick, to the study and practice of medicine, to the

furtherance of the Roman Catholic church by missions. Thus were organized the *Theatinians*, in 1520, by John Peter Caraffa (or, more properly, Theate, afterwards Pope Paul IV.), who devoted themselves expressly to the propagation of the faith (*fig. 5*, Theatinian nun); the *Barnabites*, consecrated also to missions and to the instruction of the young, established by several persons at Milan in 1533 (*fig. 23*, Barnabite); the *Bartholomæans*, by Bartholomew Hobhäuser, in Salzburg, in 1640; the *Lazarists*, by Vincent de Paula, at Paris, for missions and seminaries; the *Brothers and Sisters of Charity*, in the beginning of the seventeenth century, for nursing the indigent sick (*pl. 34, fig. 5*, Sister of Charity of St. Vincent de Paula; *pl. 33, fig. 19*, Sister of Charity of another cloister); the *Jesuits*, by Ignatius Loyola, in 1534, for the promulgation of the Catholic religion, the consolidation of the hierarchy, and the furtherance of their own power (*pl. 33, fig. 17*, Jesuits; *fig. 18*, Jesuit missionary); the *Somaskians*, the fathers of Christian doctrine, for public instruction; the *Priests of the Oratorium* (*fig. 21*); the *Piarists*, &c., &c.

The orders of nuns sometimes chose the same titles as the monks; others united with the monastic orders without assuming their names. Thus the *nuns of St. Clarissa* (*pl. 32, fig. 24*), the *nuns of the Immaculate Conception* (*pl. 33, fig. 12*), the *nuns of St. Urban*, the *nuns of the Annunciation* (*fig. 11*), all belonged to the Franciscan order, while the *Angelicals* attached themselves to the Barnabites. Finally, others retained their independence, both in name and support, adopting for the most part the rules of St. Augustine. Among these we mention the *nuns of Penitence*, of *Magdalena*, the *Salesians*, the *nuns of St. Ursula* (*pl. 33, fig. 4*), the *Hospital nuns* (*fig. 16*, nun of this society of the Hôtel Dieu in Paris; *pl. 34, fig. 6*, Hospital nun of La Flèche). There were also Hospital monks (*pl. 33, fig. 7*, Hospital monk of *St. Jaquet du haut pas*).

The *Society of Beguins* was composed of pious women, who betook themselves to a thoughtful, solitary life, without assuming any particular vow. Some writers trace their origin to St. Begga, and others to a priest of Liège, Lambert le Begue (1180), whilst others say that the society was formed as early as the year 1000, by the unostentatious union of a number of pious women. They began in the Netherlands, and in the thirteenth century spread over Germany, France, and Switzerland. Their usual dress was grey or brown, but in Lower Saxony they wore a sky-blue habit. They either resided all in one building, or in several houses standing together, in large yards or inclosures. In some places, as at Cologne, they numbered 2000 persons. They maintained themselves by legacies and foundations, and by their own work, especially weaving. The membership of this society was frequently obtained by purchase, and the fortunes of deceased members fell to the common fund. Upon their entrance into the community each one took a vow of chastity and obedience; but the constitution permitted the members at any time to withdraw and marry. The order exists now only in the Netherlands. *Pl. 33, fig. 6*, a Beguin nun.

To the numerous associations already described we add yet others, members of which are represented on our plates. The *Bethlehemites*,

established in Guatemala in 1659, by Peter Betancourt. They obey the rules of St. Augustine, labor in the education of youth and the relief of the sick, confine their operations to America, and wear the dress of the Capuchins, with a shield, on which is painted the birth of the Savior (*pl. 33, fig. 20*). A branch of this order, the *Bethlehemite Sisters*, founded by Count Cifuendes, live in Spain, and are regulated by the precepts of St. Franciscus. The *Alexians*, or Cellites, of Flanders, sometimes called Cell Brethren (*pl. 33, fig. 8*), constitute an important order of lay-brethren, and their cloisters are houses of correction for refractory children. In periods of general sickness they strive to alleviate suffering; they attend the execution of malefactors, and take charge of funerals, whence their name Cellites, from *cella*, a grave. There also exist *Alexian nuns*, who take the name of the Black Sisters. The *Ambrosian monks* (*pl. 33, fig. 9*) arose in the fourteenth century, under Pope Gregory II., and called themselves after St. Ambrosius, though they followed the rules of St. Augustine. An order of *Ambrosian nuns* was founded in 1408. Their chief cloister is in Pavia. The *order of St. Mary's Visitation* (*visitationis Beatæ Mariæ congregatio*) was established by Francis of Sales, bishop of Geneva. The members pledge themselves to seek out and provide for sick, maimed, or destitute girls (*pl. 33, fig. 13*, nuns of this order). *Visitantes* in Flanders (*pl. 34, fig. 1*); *nuns of the order of the Word-become-Flesh* (*pl. 33, fig. 14*); *nuns of the Congregation of Notre-Dame* (*pl. 34, fig. 2*); *nuns of the order Notre-Dame de la Miséricorde* (*pl. 34, fig. 3*); *priests of the order of Missions* (*fig. 4*); *Poor Volunteer of Flanders* (*fig. 7^b*); *monks of the order of Vallombrosa* (*pl. 32, fig. 20*); *Religious of the Society of the Blessed Jesus* (*pl. 33, fig. 10*). *Fig. 24* represents an ordained clergyman of the theological schools of France and Belgium.

The domestic work of monasteries and cloisters was performed by lay brethren and sisters, who were first introduced by the order of Vallombrosa. Still another class of inmates of cloisters was composed of those persons who, without assuming any vow, or being ecclesiastics, belonged to the order. These were called Tertiarians. Though they were allowed to wear the dress of the society, they usually contented themselves with the scapulary under their citizen's clothing. So valuable was the privilege of belonging to an order regarded, that many persons paid large sums to secure a place as Tertiarian. St. Francis of Assissi first introduced this class among the Franciscans.

The same leading principle which had called into existence the cloisters and nunneries gave rise to a new society in the twelfth and succeeding centuries. These were the Templars, originally noble pilgrims, united in view of assisting sick and needy pilgrims, or such as were exposed to danger, and in order to combat the infidel Turks; but subsequently becoming strong and formidable, they forgot the design of their institution, and mingled in political contests. In imitation of these spiritual orders, the sovereigns founded secular orders, by way of securing in their members trusty friends to the throne. Among the spiritual orders of knighthood the following have the greatest reputation :

1. *The Order of the Knights of St. John.* As early as the year 1048, some merchants of Amalfi, in Lower Italy, had erected near the Holy Sepulchre a hospital for the reception of sick and destitute pilgrims. The hospital was placed under the protection of St. John the Baptist; hence the name of the association, Knights of St. John, though the monks were also called Hospitallers. In connexion with this order was established that of the Dames of St. John of Jerusalem (*pl.* 35, *fig.* 11, sister of this order).

By liberal donations wealth poured in from every quarter upon the Knights and Dames of St. John, and they consequently rose to a distinguished position.

After the conquest of Jerusalem, in 1118, the order of St. John was divided into three classes: knights, clergy, and serving brethren. The knights protected the pilgrims against the Saracens; the clergy performed divine service; while the serving brethren administered to the suffering pilgrims. This order resisted for a long time the attacks of the Saracens. The Turks, however, finally triumphed, and the Christians lost the Holy Land, when the Hospitallers settled on the island of Cyprus, whence, however, they were soon driven by the Turks. They then went to the Island of Rhodes (1310). They could not, however, permanently guard the place against the ferocious attacks of the Turks. They at length evacuated it, and removed to Malta, which the emperor Charles V. had given them, in 1530. From this period they took the name of Knights of Malta. In the year 1798 Napoleon captured Malta, but two years afterwards it was recovered by the English. It was not, however, restored to the knights, whose order answered no practical purpose in this age; and since then it has only existed as a title to wear certain decorations.

The costume adopted by the Knights of St. John consisted of a black mantle, on which was fastened an eight-pointed cross of white linen. During war they wore a red tabard, with a white cross without points, on the breast and back; more recently a red uniform, with white trimmings, and a single cross upon the breast. The knights of the present day wear in the button-hole a golden, white enamelled cross upon a black ribbon. *Pl.* 34, *fig.* 8, grand master of the Order of Malta; *fig.* 9, Knight of the Grand Cross; *fig.* 10, Knight of Malta with his mantle.

2. *The Order of the Knights Templars.* This society originated after the conquest of Jerusalem in 1118, and was established by nine knights, who pledged themselves to conduct the pilgrims through Palestine, and protect them against the infidels. Baldwin, king of Jerusalem, assigned them a location near the site of Solomon's Temple, whence their name of Templars. By the aid of rich legacies and donations, the order soon rose to rank and importance. They probably numbered more French than any other knights in their ranks. Their ruin was caused by Philip IV. (the Fair) of France, in 1307. He arrested all the Templars in his dominions, subjected them to a painful imprisonment, and accused them of unparalleled atrocities. By means of torture he forced them to confess crimes of which they were innocent, and ordered many to be buried alive. In 1312 Pope

Clement V., in a general council held at Vienne (on the Rhone), dissolved the order. Their property was confiscated by the crafty and avaricious monarch, who quietly appropriated it to his own purposes.

The order was composed of knights, squires, and serving brethren, besides a large number of ecclesiastics. As a badge of distinction they all wore a linen girdle, and the knights wore, besides a simple suit of armor, white linen tabards, and mantles, with a blood-red cross. The clerical members usually wore the white surplice with the cross; and the serving brethren a grey or black habit likewise with the red cross. *Pl. 34, fig. 12*, Templar in domestic dress; *fig. 13*, Templar in full costume; *fig. 14*, Templar in armor on horseback.

3. *The German Knights, or the Order of Lords.* This order was founded by Germans in 1190. Like the other orders, they took the vow of obedience, poverty, and celibacy; and like them, strove to protect the poor and helpless. After the loss of the Holy Land they settled at Venice. In 1229 they were called out under their Grand Master, Hermann von Salza, to aid the Poles against the Prussians. At that time the Prussians were heathens, whom, after a contest of fifty-three years, the Order of Lords finally conquered and converted to Christianity. The Grand Master fixed his residence at Marienburg, 1309. During the reformation of the sixteenth century, the Grand Master, Margrave Albert of Brandenburg, with a large body of the order, passed over to the Lutheran church, and the remainder settled in the town of Mergentheim in Würtemberg. Subsequently the office of Grand Master vested in the person of the Emperor of Austria, and in 1805 the order was abolished. The German Knights were known also by the names: Knights of the Cross, Knights of the Virgin Mary, Brethren or Hospitallers of the German House of Our Blessed Lady at Jerusalem. They wore a white mantle with a black cross. *Pl. 34, fig. 15*, Grand Master of the German Knights.

The infidels of Palestine did not constitute the sole objects of the warlike zeal of the spiritual knights. It was directed against the heathens generally, wherever they stood in the way of Christianity. Thus in Spain the Alcantara, Calatrava, and other organizations, fought with the Saracens; and in Prussia and Livonia, the Brethren of the Sword against the heathenish tribes of those countries. The Calatrava (*pl. 34, fig. 17*, knight of this order) was founded by Sancho III. in 1158; the Alcantara (*fig. 18*) by Alexander III., in 1177; another order, that of St. James of the Sword (*fig. 16*), in Spain, in 1170; the Order of Avis in Portugal, in 1143, by Alphonso Henriquez (*fig. 19*); the Order of St. Stephen, by Maria Theresa, in Austria, in 1764 (*fig. 20*, knight in costume of ceremony); the Order of the Holy Ghost, by Henry III. of France, 1578 (*fig. 21*, knight, and *fig. 22*, hospitaller of this order); and the Order of Aubrac by Allard in Flanders, in 1120, (*fig. 23*, ecclesiastic of this order).

In the seventeenth century it became customary to organize associations with temporal rather than religious motives. Hence originated the various academies of art and scientific societies, &c., &c. Secret orders were likewise formed, whose objects were mostly superstitious, and therefore kept

secret from the public at large, as the Alchemists, Rosicrucians, Illuminati. Other secret societies of several kinds, as the Carbonari, Virtuous Alliance, &c., had political tendencies.

Finally, we must briefly mention the Freemasons, whose objects are somewhat different, and who do not assume the title of Order, but wish to be considered as a society or an association, although they at first themselves called their fraternal association an order. Their real origin is not positively known. They first sprang into public notice in 1723, by their book of constitutions, whose author was James Anderson. From this book we learn that the Freemason's association originated in the diverse associations of architects of the middle ages, from whom they had entirely separated in London, in 1717, retaining only their symbols; and that their objects were exclusively charitable and educational.

The society at present is composed of men who follow some proper avocation, and have a good reputation. They are admitted with certain ceremonies, and call each other brethren, whereby they indicate that they cherish an inviolable friendship for each other, and are always ready to afford one another speedy and effectual assistance. In their meetings (lodges) all distinctions of rank belonging to common life are forgotten. Wealth and poverty, obscurity and eminence, together with all religious peculiarities, for the time being, cease to exist, and all are esteemed as brethren. By their constitution they pledge themselves to preserve inviolate the secret of the proceedings of the lodge, though in place of the former terrible oath the promise is now made upon the word of honor.

Freemasonry soon spread all over Europe, although in some countries it continued to be prohibited by law. In 1725 the first lodge was established at Paris, similar to those in England, though it soon after underwent important alterations. In 1735 the order passed into Germany, and in 1780 it began to excite attention in America and India. According to the English form, freemasons occupy three different degrees: apprentice, companion, and master. The Grand Master is the highest authority. In several lodges, *e. g.* the Scottish, additional higher degrees exist, whose members are often unknown to those of lower degrees.

Pl. 35, fig. 1, initiation of a candidate into the first degree; *fig. 2*, initiation of a master mason; *fig. 3*, conferring of the thirty-third degree according to the Scottish ritual; *fig. 4*, funeral of a brother mason.

After this digression, we return to the church and the clergy. The power of the priesthood increased from year to year. In the long night of intellectual darkness, the church possessed almost unlimited means of strength and conquest. The priesthood could safely assume an authority before which princes bowed with reverence. It hoarded in the monasteries the treasures of knowledge, dazzled the people by mummeries, blazoned trifles as the genuine product of true Christianity, and, above all, shielded itself from investigation under the pretence of ineffable sanctity. In fact the spiritual powers, having a common interest, common laws, and a well constructed constitution, managed to elevate the priestly order above every other; the church employed the all crushing power of the anathema

and the interdict, and subsequently, the Inquisition, that dreadful tribunal for all manner of heresy, which invented cruelties from which the ancient pagans, as well as the most savage tribes of the new world, would have turned away in disgust and horror. The feelings revolt at the thoughts of the refined barbarities perpetrated by Christians, nay, by Christian priests. By means of *p*ls. 30, and 31, the eye can realize some of the horrors connected with the Inquisition, which we should despair of fully conveying by description.

The Inquisition owes its institution to Pope Innocent III., in 1138, who established a tribunal for the suppression of some rapidly increasing sects, as the Arnoldists, Waldenses, and Albigenses. To this work the Dominican monks were judged competent. This tribunal, however, only attained to a decided rank and celebrity under Gregory IX. In 1228 it was located at Toulouse, and was placed under the superintendence of the papal legate, one spiritual, and three temporal vice-presidents. At that time it directed its energies especially against the Albigenses.

At first the power of the inquisitors was quite limited, and they operated indirectly upon the objects of their displeasure. Instead of punishing the heretics, they endeavored to engage princes and magistrates in this work, while they confined themselves to lectures against the sects. It was also a part of their business to record the number, names, common avocations, and success of the dissenters, the activity of the bishops and other clergy in arresting the sectarian spirit, and to transmit the result of their observations to the Holy See. The powers of the institution, however, were soon enlarged, and in due time its officers were permitted to dispense indulgences and to preach in favor of crusades. They received letters of safe conduct, the right of investigating charges of heresy, of passing sentence upon those convicted, and of compelling the civil authorities to execute their verdicts. If an individual to whom the charge of heresy was brought home refused to abjure his opinions, his punishment consisted in being burnt at the stake; and if he recanted, his doom was perpetual imprisonment.

Venice created a court of Inquisition, independent of the pope, but employed for president a papal nuncio, assisted by the patriarch, the inquisitor, and three temporal judges. In Naples the Inquisition did not exist in its true form, but in Sicily one was established under the auspices of the Spanish Inquisitor-General. Several cities in France adopted it, but the people interposed, and made an energetic opposition to its remaining there; and even when the hostility was less decisive, the inquisitors abandoned the kingdom. In Germany, Netherlands, and England, all efforts to establish its supremacy failed. The theatre of its fullest sway lay in certain districts of Italy and Spain. In 1536 it established itself firmly in Portugal, and even passed over into both the East and West Indian colonies.

In Spain the tribunal directed its chief efforts against the Jews and Mahometans. Torquemada, confessor of Queen Isabella, induced her to promise at her accession to the throne, a vigilant persecution of heretics; and as the best means to accomplish their extermination, he had suggested the Inquisition. On her recommendation it was soon introduced

by her husband, Ferdinand of Arragon. Pope Sixtus IV. sanctioned its establishment in 1483, and Torquemada became its first inquisitor-general. It was the infamous lot of this wretch, in the short period of fourteen years, to drag before the tribunal 100,000 persons, and to consign 6000 to the stake. In the execution of his horrible duties, he had the assistance of numerous subordinates, who bore the unassuming title of "Familiars of the Holy Office." He armed the younger members among these agents in 1494, and conferred upon them the name of "Warriors of Christ!" They were amenable only to the authority of the Inquisition, and, by virtue of their position, enjoyed peculiar prerogatives.

Such was the cruelty exercised against all suspected persons, and so perfect the system of espionage employed by Torquemada, that even many of the nobles of Spain, though shocked at the atrocities of the tribunal, preferred becoming its assistants to being reported as heretical, and falling under its fearful power. This example of the nobility, taken in connexion with the valuable privileges conferred by Ferdinand of Arragon upon all assistants of the Inquisition, was gradually imitated by large multitudes of the lower orders. They were exempted from taxation and other public liabilities, and soon there were as many assistants of the Inquisition as there had been taxpaying citizens. The Familiars were assistants of the Inquisition in every imaginable manner. They tracked out the retreats of the heretics, denounced them, had them arrested, and conducted the prisoners to the place of execution. This act was called performing the part of a godfather (*padrino*).

The officers of every Spanish inquisitorial tribunal consisted of three inquisitors, three secretaries, one *alguacil* (summoner), and three receivers and assessors, besides numerous familiars and jailers.

At first the tribunal directed the fury of its fires mainly against the professors of the black arts, astrology, soothsaying, magic, sorcery; against the ungodly and the blasphemers, and those who insulted the Inquisition. Subsequently, it enlarged its jurisdiction, and punished Jews, Mahometans, and unbelievers, especially if they were found opposing the brethren of the holy office. Sheer covetousness not unfrequently prompted its activity. Sometimes the inquisitors employed their official power to harass their personal enemies; and in this way the institution exerted its malignant spirit against many excellent Christians. Thus Padilla, Porlier, chief justice of Arragon, and thousands more, became its victims, because they earnestly asserted the rights of man against its aggressions. Johanna Bohorquez, Mary of Burgundy (surnamed the mother of the poor), Rodriguez de Valero, and numerous other true Christians, suffered martyrdom. Juan d'Avila, St. Juan de la Cruz, St. Juan de Dios, St. Theresa, Father Luis de Leon, Father Luis de Granada, Mariana, every one of whom Rome itself has been compelled to denominate saints, besides other men whose erudition and genius, combined with true Christian piety, were the wonder of Europe, and therefore the envy of their persecutors, all had to encounter the indignation and malice of this accursed institution. The Inquisition relentlessly persecuted the noble Moorish knights, who had passed from

Mahometanism to Christianity, and their descendants, for they were wealthy, and the inquisitors were thus tempted to stain their hands in their blood. Deza and his successors, having affixed to the flower of the Andalusian knights the odious name of *Marranos* (swine), persecuted them to the death as heretics and rebels. As a pretext for thus turning their arms against their brethren, they accused them of a mere external adhesion to Christianity, while they secretly entertained a predilection for Islamism: and to this charge false witnesses could always be induced to swear. The rich Jews, also, who had adopted Christianity, soon learned that nothing was to be gained by abjuring the religion of their fathers.

Emboldened by these successes, the agents of the Inquisition sought to prostrate all barriers to their sway whether they were erected by clerical or worldly authorities. At first the use of the rack and torture was only allowed once, but soon it was applied several times, under pretence that the renewed infliction of torture was but a continuation of the former one. If a victim confessed all that was charged against him, and underwent the full penance imposed, then the tribunal, according to its own rules, should give up the prosecution, and be contented with a considerable fine. But in such cases the vindictive and covetous spirit of Deza, Lucero, and others, not satisfied with so mild a punishment, instituted a new charge, accusing their victims of having confessed insincerely, and declaring them false penitents. This crime they had to expiate at the stake, or in perpetual confinement. In either case the property of the condemned was confiscated for the benefit of the Inquisition.

By such machinations as these the authority of the Inquisition became almost unlimited, and princes themselves could not escape its grasp. Whoever fell under suspicion was summoned three times to attend his trial. If he failed to appear, his absence was construed into a tacit confession of guilt; he was excommunicated, and condemned to pay a heavy fine. Very rarely did an accused escape, for the familiars of the Inquisition, the Brotherhood of the *Cruciata*, and the *Hermudad*, a company of police soldiers, appointed by the Council of Castile to guard the safety of the public highways, persecuted relentlessly whoever had been marked by the inquisitorial tribunal. Nobody dared to oppose the arrest of an accused. He was considered proscribed; his own relatives and friends forsook him; he found no place of refuge; no public services he might have rendered, no rank, however exalted, could protect him; no testimony of his innocence from friends or relatives was admitted; the unfortunate victim was doomed even before the commencement of the trial. Stripped of everything valuable about his person, the helpless wretch was thrown into prison. The horrible prisons of the Inquisition consisted of subterranean vaulted passages, about ten feet high, and branching off into numerous small cells, surrounded with walls about five feet in thickness, and entirely without light. Any word uttered by the captive, except in reply to a question, was punished with merciless scourging. At his trial he did not learn who witnessed against him; no proof of their testimony was asked of the witnesses; their uprightness and

veracity were not questioned. The accuser himself, as well as the relations of the accused, were admitted as witnesses, provided they would testify *against* the prisoner.

If, at the close of such proceedings, the accused did not confess the crime imputed to him, the torture was applied. Of this there were three degrees: the cord and pulley, water, and fire. The apartment in which the penalties were inflicted was called the torture chamber. It was a circular room, in a deep cellar. Two dim tapers cast a pale, sickly light. The atmosphere was humid, oppressive, and burdened with a noisome odor. Water oozed through the soft stone of the walls, on which were suspended the unsightly instruments of torture, the diabolical inventions of bigoted monks, at whose very aspect the stoutest heart quailed in terror. Scaffolding for various purposes was in readiness; iron bolts, chains, screws, and spikes of frightful length, were strewed about the place; and the blaze of a huge pan of glowing coals threw a hideous glare over the whole.

The executioners were dressed in black linen gowns, which reached nearly to the feet, and wore masks of the same color. The inquisitors, with a bishop of the diocese, occupied an elevated position, so as to observe the application of the torture. At a sign from the Grand Inquisitor, the familiars seized and stripped the convict, leaving him only his shirt. He was then once more advised to confess. If he persisted in affirming his innocence, or if he maintained silence, he then underwent the torture of the first degree. The tormentors, after placing his hands behind his back, attached to them a cord which passed over a pulley at the top of the arch; then seizing the other end, they swung him rapidly to the ceiling, and then made him descend forcibly to within a small distance from the ground. By this agonizing process the victim frequently lost his consciousness. His persecutors hardly waited till he had time to revive. As soon as he opened his eyes, up he went again with greater violence, if possible, than before, and was either dropped in the same manner, or left suspended while he was once more exhorted to confess. At Rome this torture was carried on for half an hour, and in Spain for even a full hour. It often happened that the cord pressed deep into the quivering flesh, so that the blood streamed down, and the prisoner's limbs and muscles were so wrenched as to make it impossible for him to stand.

Next came the second degree, or the water torture. The apparatus for this operation consisted of a large trough, capable of holding a man's body. It was so arranged that the head lay lower than the feet. The prisoner was fixed in his position, being merely supported by a sharp-edged stave, the torturers binding his hand and feet firmly to the frame. He was then again admonished to confess his guilt. If he steadfastly asserted his innocence, a few turns of a crank would so tighten the ropes fastening his feet and hands, that they cut deep into the flesh, and drew streams of blood. Upon his continued refusal to confess, the torturers laid upon his face a fine towel, part of which covered the mouth, and part entered the nostrils; the whole was then moistened with water, which passed slowly, drop by drop, into the mouth and nose. As the fluid trickled into the throat,

nearly suffocating the prisoner, he made spasmodic efforts to expel it and inhale a little fresh air; and every exertion of this kind was certain to be accompanied by new turns of the crank, driving the cords deeper into the flesh. The water torture continued about an hour. If the patient manifested any signs of torpor or insensibility, agencies were employed to restore consciousness. Whenever the physician, who always attended the torture, suggested the impossibility of further endurance, the punishment terminated. Sometimes the nose was closed, and water poured down the throat through a funnel.

The third degree was the fire torture, which was applied in different ways. The most common application was the following: the accused was bound to a bench or to the floor, and in such a position that his bare feet could extend to a little furnace of red hot coals. The feet were held so near the fire as to feel its gradually blistering effects. Here they remained until the skin was as white as parchment, when they were basted and rubbed with oil. The power of the fire, increased by the grease, grew so great as to peel off the skin, and expose the nerves, veins, and muscles. Another contrivance was to bind the victim upon the circumference of a large wheel, which was slowly turned over the fire, bringing his body in close proximity with the coals. It was in vain to look for a cessation of tortures. They were frequently repeated, and every time combined with some new element of cruelty. If the poor captive, amid intolerable agonies, confessed to the charges made against him, he was consigned to the galleys or perpetual imprisonment, his property was confiscated, and his family proscribed.

Burning at the stake constituted the usual punishment of such as continued to refuse confession. The day on which the execution took place was considered as solemn and holy. Vast multitudes assembled to witness the mournful spectacle. The charcoal-bearers, armed with muskets and lances, headed the procession, and for this distinguished honor they bound themselves to supply, at their own expense, the necessary fuel for burning the condemned. Next followed the great white cross, being the banner of the "Children of Dominicus de Guzman," and borne by a friar of the order. The banner was followed by its order in a body. After them came the persons of rank and the public assistants of the Inquisition, who in turn were succeeded by the condemned. Foremost among those unhappy wretches walked such as expected what the tribunal styled an easy punishment. They wore the *San Benito*, a brown linen dress, on the breast of which was wrought a large yellow cross of St. Andrew. Their heads and feet were uncovered. Next came those who were destined for the galleys, perpetual imprisonment, or public flogging. The third class comprised those who expected martyrdom, and who, in reward of a late confession, had obtained the privilege of being strangled before they were burnt. Upon their *San Benito* were painted inverted devils and flames, and their heads were disfigured by the *Coraza*, or conical cap, about three feet high, and also painted. Last came the victims destined to be burnt alive. They, too, had on the *Coraza*, and bore upon their *San Benito* devils and flames in

an upright position ; they carried in the hand a yellow wax taper. Each convict was attended by two familiars and two monks, who not unfrequently had to carry their victim, who, by the foregoing torture, had been rendered incapable of walking. Behind these walked a number of carriers loaded with boxes, which contained the remains of such as had expired at the rack, or died in their cells ; not even these were allowed to enjoy the repose of the grave : their remains and their effigies were publicly burnt.

Along the sides of the place of execution arose an immense amphitheatre, designed to accommodate the members of the supreme court and other public officers. Above them was the seat of the Grand Inquisitor. Opposite appeared another amphitheatre for the prisoners. A third and smaller one supported cages in which the convicts were placed while their verdict was read to them. At the foot of the first tribune stood an altar, and opposite to it a large cross, shrouded with black crape. Galleries for ambassadors and other distinguished political functionaries, and seats for the common people, completed the remaining accommodations. As the *auto da fè* took place in front of the royal palace, the king, whenever he attended the execution, witnessed it from his own balcony.

The stakes were erected on a foundation of stone in the middle of the place. They were surrounded by fagots of straw and wood, saturated with pitch or oil ; every victim had a separate stake. The proceedings began with a solemn mass. After this, the Grand Inquisitor addressed the king, demanding of him the oath to guard and defend the faith, to be zealous in extirpating heresy, and promoting the glory of the Inquisition. He also administered a similar oath to the rest of the assemblage ; and afterwards followed a sermon by one of the Dominicans. The verdict was then pronounced, during which ceremony the Jews had spikes driven through one hand. Absolution was then granted to those who had early confessed, and then began the executions.

Each martyr knelt before the stake at which he was to be immolated, and during the operation of chaining fast his limbs and body, the monks were industriously urging him to confession. As the fire grew stronger, the flames enveloped him in their folds, and the dense smoke shut him and his writhings from the gaze of the spectators. His heart-rending cries were the only evidence of his agonies, and these soon grew faint and silent.

In lieu of the stake and pile, the inquisitors sometimes made use of a large furnace, into which several heretics might be thrown and burnt at once. Another apparatus consisted of hollow statues of plaster, capable of holding a human body. Neo-Christians, when they relapsed into their former belief, were placed inside of these statues, which were then exposed to a gradually increasing heat, killing the victims slowly.

Our plates represent some of the most important objects in the foregoing description. *Pl. 30, fig. 1*, the tribunal in session. In the extreme background sits the Grand Inquisitor. Before him stands the accused, around whom are placed a series of tables, occupied by the secretaries and other assistants. The figures in the background, with black hoods over their

faces, are executioners; those on the right hand side of the foreground are spectators. To the left of the criminal may be seen a contrivance of cruelty, worthy the inventive genius of the Inquisition. An accused was not allowed to sit down on a common bench, but only on the sharp edge of a triangular bar, supported by two cross-shaped feet. This seat was named *potro*. The prisoner who refused to confess to the crimes laid to his charge was forced to sit or kneel, often for two or three hours, upon the *potro*, a torture which was applied in the very chamber of justice. In *pl.* 31, *fig.* 1, we have the cord and pulley ordeal; *fig.* 2, the water torture; *fig.* 3, one form of fire torture; *pl.* 30, *fig.* 5, fire torture by the wheel; *pl.* 31, *fig.* 4, *auto da fè* in Spain; *pl.* 30, *fig.* 2, the punishment of flogging; *fig.* 3, neo-Christians nailed through the hand and exposed in the pillory. This punishment was inflicted upon such as relapsed into Judaism, and the inquisitors termed it retaliation for the crucifixion of Christ. *Fig.* 4, the process of strangling before burning; *fig.* 6, burning of heretics in the furnace, at Seville.

From an examination of this whole subject, it is easy to see how the priesthood of the middle ages exerted so unlimited a control over the fortunes of mankind. They even ventured to punish kings and princes. Thus we see, in the commencement of the thirteenth century, French kings publicly endure the corrections of the church, as for instance, scourging (*pl.* 23, *fig.* 4), and Henry IV. do penance, barefoot and in penitential garments, before Gregory VII. at Canossa; every new triumph over the secular authorities leading to new and grosser abuses of clerical power, already sufficiently degraded by the freest indulgence in the lowest passions, avarice and voluptuousness.

The Inquisition had full sway until the eighteenth century, when its horrors were gradually diminished, and the dreadful *auto da fè* was very rarely seen. In 1770 a royal decree prohibited the arrest of any subject before the full establishment of the accusation; and in 1784 another law was passed, making it obligatory on the inquisitors to submit to the king for his approval the proceedings against every noble, minister, officer, or person employed by the state. The holy office was first peremptorily abolished by Napoleon in 1808. Ferdinand VII., after his return to Spain, reinstated it; but it was effectually abolished by the constitution of the Cortes, in 1820.

THE CRUSADES.

The crusades, as has been previously stated, were expeditions which many, nay, all Christian nations, undertook in common; uniting upon one object, that of guarding the pilgrims to the Holy Land against the attacks of the Saracens and other savage hordes, and of wresting from the hands of these heathenish people the dominion over the land where Christ had lived and died. Religious, not political motives, actuated the crusading hosts.

Pilgrimages to spots whose memory was hallowed by religious associations

had always been considered as works of piety, even among heathens. The same feeling prompted the Christians, long before the eleventh century, to perform wearisome and costly pilgrimages to Jerusalem and the Holy Land, where Jesus was born, crucified, and buried. The scenes around them awakened in their minds the holiest recollections, and stimulated them to a loftier faith and hope, so that the pious pilgrim often imagined himself nearer heaven in Palestine than in his native land. These pilgrimages, however, were attended with considerable difficulty and danger, for the Saracens, who hated the Christians, not only desecrated the spots considered sacred by the followers of Christ, but did all in their power to prevent them from visiting those places. They waylaid and plundered the pilgrims, imprisoning some and slaughtering many who fell into their hands.

Pope Sylvester II., as well as Gregory VII., appealed to Christendom at large against these atrocities. They formed the project of recovering the Holy Land from the infidels. The suggestion, as it looked to the aggrandizement of the Church, met with a favorable reception from the clergy. Many hoped thereby to obtain bishoprics or patriarchates. The knights were dazzled with prospects of glory and renown; ambitious squires exulted in the hope of early knighthood; merchants longed for the wealth which the enterprise would give them; bondsmen and serfs anticipated a speedy and permanent emancipation; bankrupts desisted the means of defrauding their creditors; while gamblers and vagabonds of all descriptions regarded the coming strife as a bright era for their several professions. In spite of so many elements joining in the movement, from more or less selfish motives, it cannot be denied that the purest religious zeal actuated the majority. Some wished to leave the scenes of war and strife in the west for a nobler career; others believed that they would thereby expiate previous sins; and the whole undertaking was considered by the pious as a work pleasant to Heaven, and therefore in itself a virtue.

Under Pope Urban II. the crusades first began to play an active part. He issued a summons to all Christian people to contribute towards recovering the Holy Sepulchre, and the Holy Land altogether, from the hands of the infidels. A visionary hermit of Picardy, Peter of Amiens, had induced Urban II. to carry this grand plan into execution. He had visited the Holy Land, and had witnessed in sorrow the wrongs and indignities to which the Saracens subjected the pilgrims. These enormities he depicted to the supreme pontiff in glowing language, exhibiting a certificate from the bishop of Jerusalem, and closing by asserting a call from Heaven to avenge the wrongs of the Christians. Urban saw in Peter an appropriate agent in arousing to fury an indignant populace. He dismissed him with the apostolic blessing, and bespoke for him every necessary aid and encouragement. Peter set out upon his mission. Mounted upon an ass, his head uncovered, his half-famished body encircled by a rope, and holding a crucifix in his hand, he rode from village to village, and from country to country, calling upon the faithful to rally to the rescue of Jerusalem. He painted in the most dismal colors the

intolerable sufferings of the pilgrims; and in the most fiery language harangued his audiences, urging them on to revenge against the Saracens. As a final argument he usually produced a written document, which he alleged he had seen falling from the skies, and which urged the friends of the Church to immediate action. These inflammatory appeals were not made in vain. They quickened the zeal of his audiences, and rendered more rancorous than ever their hatred of the Mahometans.

In the meantime Urban was aiding the work by other agencies. He assembled a church council at Piacenza. Thirty thousand persons attended it. The excitement was immense, but no definitive action was had. During the next year (1095) another council was called at Clermont, in France. Here large bodies of the nobility offered themselves to the pope. Urban elected a chief, whom he ordered to kneel down while he invested him with the red cross upon the right shoulder. The rest of the knights were decorated with the same sign, whence their appellation of Knights of the Cross. Godfrey of Bouillon, duke of Lorraine, took the command. Every earthly object was sacrificed for a place in the army. When men had no money they sold their lands and castles to the cloisters for a mere trifle; and when they had nothing to sell, they entered the service of the knights.

The commander fixed upon the month of August, 1096, for the commencement of the march. The impetuous Peter of Amiens, however, impatient of the slightest delay, at once set forward with 40,000 men, whose ranks soon swelled to 80,000. Peter divided his command with Gautiers, or Walter, a Burgundian knight, who being poor, bore the name of Walter the Pennyless. The wild multitudes consisted mostly of natives of France, Lorraine, and Lombardy, though in their march they absorbed vast numbers in South Germany, Hungary, and Bulgaria. They felt at liberty to tax freely the inhabitants of those countries through which they passed; and when their exactions were resisted, as in Hungary, where the inhabitants were less ready to support the disorderly multitude, they had recourse to violence, and thousands were killed in the conflicts which ensued, so that on his arrival at Constantinople, Peter had scarcely one fourth of his forces remaining.

The Germans had thus far stood aloof from the crusades, but were at length induced to join with the Italians and French. To quicken the hesitating, numerous prodigies and omens were at hand. A comet appeared, and marvellous sights were seen in the sky; and, as usual, the clergy availed themselves of these phenomena to inflame and impel the superstitious masses. A report prevailed that Charlemagne had risen from the dead, and was commanding the crusaders in person. The Saxon Volkmarr marshalled 12,000 of his countrymen; the priest Gottshalk raised a considerable force in Franconia; and Count Emico of Leiningen, collected another on the Rhine. Prior to their departure for Constantinople, they began a furious and unprovoked persecution of the Jews, great multitudes of whom fell in the districts of the Rhine. Gottshalk and his fanatics, however, met a cruel fate at the hands of the Hungarians, not more than one third of the Franconian crusaders being so fortunate as to reach

Greece. The Greek emperor rid himself of their presence as soon as possible, by promoting their speedy transshipment to Asia. As soon as they entered Natolia they resumed their course of rapine and murder. Discord broke out in their ranks, and this circumstance was turned to account by Soliman, sultan of Iconium, who routed the crusaders so effectually at the battle of Nicæa, that Peter, with only about 3000 surviving comrades, embarked and sailed back to Constantinople.

After the loss of so many lives, the main body of the crusaders was seen to approach. They amounted to 100,000 steel-clad knights and 200,000 stalwart foot, led by the noble duke of Lorraine, Godfrey de Bouillon, aided by Hugh the Great, count of Vermandois (brother to the king of France), Robert, duke of Normandy (son of William the Conqueror), Robert, earl of Flanders, Raymond of Toulouse, Stephen, earl of Chartres, the brave Bohemund, prince of Tarent, Robert Guiscard's son, and his heroic relative, Tancred. Immediately after passing the Bosphorus, Godfrey besieged and captured Nicæa, June 20th, 1097. A second victory at Dorilæum opened to him the way to Syria. The army now encamped at Antiochia, while Godfrey's brother, Baldwin, erected a principality in Odessa, and extended his sceptre over some of the finest provinces of Mesopotamia and Armenia. Antiochia, After a vigorous resistance, submitted; but the crusaders soon found themselves completely surrounded by their enemies, who cut off all supplies from the conquered city, so that the impending famine was only escaped by a bold sally. They now turned towards the real object of the expedition, the holy city of Jerusalem. Their progress was, however, fearfully opposed by the Turks, who at first had stood aghast at the appearance of men clad in glittering steel, but by experience had become used to the formidable armor, and had learned how to attack them to advantage. They waylaid them in the mountains, and being quite familiar with the ground, selected the most difficult passages, and assailed their adversaries with no small success; they also cut off their supplies, and destroyed the crops in the fields by fire. The crusaders soon found themselves surrounded by dangers which they had never anticipated. They had to endure not only the calamities of the field, but the effects of the climate; and thousands of women and children sank disheartened on the ground, and died. Not more than 60,000 men, and these careworn and weary, reached Jerusalem. They kept up a desperate siege upon the city from the 7th of June till the 15th of July, when they finally carried the place by storm.

The caliph of Egypt had united the city to his dominions a few years before, and now sought to recover it from the Christians; but he was defeated in the battle of Ascalon, and Godfrey of Bouillon was crowned king of the new Christian kingdom. But he died in the following year (1100), and was succeeded by his brother, Baldwin I. Then followed his relative, Baldwin II., in 1118; and finally, in 1142, the son of the latter, Baldwin III. These three princes maintained, with various fortunes, a constant war with the Saracens; and as their whole force finally dwindled down to 12,000 men, they would probably have abandoned

the contest but for the aid they received from the clerical orders of knights then growing into importance, and from new arrivals of crusaders.

In 1147 a new crusade, composed entirely of Germans, marched under Conrad III., and was strengthened by other accessions under Louis VII. of France. Reports had reached Europe that Odessa was lost, and 46,000 inhabitants put to death; and Bernard, abbot of Clairvaux, engaged in the work of arousing the powers of the west to a renewed effort in behalf of the suffering Christians in the East. Conrad advanced with his gallant followers, but the Greek emperor, Emanuel Comnenus, who had several times behaved perfidiously towards the Christians, prepared their ruin by treachery and intrigue. When they had crossed to Asia, he caused them to be led by false guides into barren wilds, where they were abandoned and left to perish, partly by the terrors of the desert and partly by the sword of the enemy. Conrad commenced his retreat upon Constantinople with but few of his men. On the way he fell in with the French crusaders under Louis. They, too, had to endure the same calamities as his own forces. The relics of both armies now combined in the siege of Damascus, but discord and want of unity in the command prevented a successful issue. The siege had to be raised, and in 1149 the French and Germans, under their respective kings, returned to Europe, leaving their project of subjugating the East unaccomplished.

Notwithstanding these failures, the brave Baldwin III. did not despair. He occasionally received assistance from the Knights of St. John and the Templars, but their own dissensions finally deprived him of the assistance which he so greatly needed. In the midst of severe trials, he died in 1150. Almeric succeeded him until 1152, when Baldwin IV. obtained the throne: both kept up a continual contest with the Saracens. Baldwin's successor, Baldwin V., accomplished nothing of importance, and was followed by Guido of Lusignon, who closed the dynasty of the Christian kings of Jerusalem. Guido suffered a terrible defeat at the battle of Tiberias, in 1187, and with the Grand Master of the Templars, and the flower of his army, was taken prisoner. The Saracenic governor of Egypt, Sultan Saladin (Selaheddin of Kurdistan), not satisfied with the victory, advanced to the city of Jerusalem, and captured it, October 3d, 1187. This sultan, a son of Ejub, and commonly known by the surname, Lion of Kurdistan, is one of the noblest and most splendid characters in Oriental history. Nothing so much adorns his reputation as his general clemency to the Christians, most of whom he liberated from confinement, and then facilitated their return to Europe.

When the news of the fall of Jerusalem spread through Europe, it served as a signal for the organization of a third crusade. In Germany the aged Frederic I. devoted the resources of his empire to the cause; and the kings of France and England, Philip Augustus and Henry II., placed themselves at the head of the army. Henry died before accomplishing his vow, and his son, Richard the lion-hearted, succeeded him in command. The venerable Frederic, too, died before reaching the Holy Land. The remain-

ing leaders accomplished but little, their efforts being thwarted by unhappy dissensions, which were mainly caused by the imperiousness of the proud Richard. They conquered, with great difficulty, only Ptolemais and St. Jean d'Acre, and maintained themselves on a small territory on the coast. Discouraged at the failure, Philip Augustus returned to Europe. Richard remained, but though he signalized himself in his engagements with Saladin by astonishing personal bravery, he met with but little success, and unable to recover Jerusalem, concluded a truce with the Sultan, in 1192. Saladin died the following year, at Damascus, and Richard, in 1199, in France.

During the reign of Almeric II., a fourth crusade was projected under the supervision of French and Italian leaders. It was, however, turned into a different channel by events at Constantinople. The Greek emperor, Isaac, was deposed by his brother Alexius III., and afterwards imprisoned and deprived of sight, in 1195. His son, having escaped assassination, besought the protection of the crusaders. Commanded by the brave and sagacious doge, Dandolo of Venice, Margrave Boniface of Montferrat, and Count Baldwin of Flanders, the crusaders gave up the war with the infidels, advanced against Constantinople, and carried the place by storm in 1204. After several counter-plots and revolutions, Count Baldwin of Flanders was crowned Greek emperor. Thus originated the Latin dynasty in the East. It existed fifty-seven years, 1204-61.

The crusade of 1212 deserves a passing notice. It was composed of *children*, 20,000 from Germany, and 30,000 from France. It was believed that the infidels would not be able to resist such numbers of innocent beings. But most of these juvenile warriors perished with hunger and fatigue, while the rest were captured by slavetraders, and sold into Egyptian slavery.

Andreas, king of Hungary, instituted still another crusade, in 1217, and now directed his hostilities against Egypt, the land which had hitherto been the cause of so many losses and misfortunes to the Christians, and which, when conquered, would open a passage to the Holy Land. King John, also, fitted out a similar expedition, and in 1221 captured Damietta. Sultan Meleddin offered to exchange Jerusalem for Damietta; but the Hungarians rejected the proposal, and advanced to the siege of Cairo just at the time when the annual inundation of the Nile came on. The sultan opened upon them its sluices, and the floods rose upon them, threatening the complete annihilation of the Christian army. Nothing but a hasty peace saved them. Damietta was to be evacuated, and a truce of eight years was to be observed. The sultan magnanimously returned the Holy Cross which had remained in the hands of the Turks since the battle of Tiberias in 1187.

While Germany was suffering from rude violence and lawlessness, France was moving on to glory and refinement under the mild reign of the fatherly Louis IX. (*pl.* 23, *fig.* 3, St. Louis administering justice in the open air). This monarch, during a severe fit of sickness, had made a solemn vow to undertake a crusade, should God spare his life and restore him to health; and upon his recovery he immediately began the prepara-

tions for redeeming his vow. He directed his crusade against the sultan of Egypt, who still had possession of Jerusalem and Palestine. Louis embarked in 1248, with his queen, his brothers, and numerous French nobles. They landed at Damietta, which they soon conquered. Louis won two other splendid victories over the sultan, but his forces beginning to suffer under the influences of the climate, he saw his fortunes rapidly declining. Pestilence and famine prostrated his soldiers, and compelled him to withdraw. Pressed by the pursuing Mahometans, he risked another battle at Mansura, 1250; but though the French behaved with admirable courage, fortune deserted them, and they were obliged to surrender themselves prisoners to the sultan. The latter was so impressed by the noble bearing of Louis that he restored him and his companions to freedom, upon their delivering up Damietta, and agreeing to pay a stipulated ransom (1254). Louis at a later period resolved to undertake a second crusade, but instead of doing so he led his expedition against Tunis, in the hope of converting the sovereign of that state to Christianity. The hope was not to be realized, and Louis closed his career in Africa in 1270.

After this failure no crusade of any importance was undertaken. By the fall of Ptolemais (1291) the Mahometans obtained nearly all the Christian possessions in Palestine or on the coast of Syria; so that after more than two hundred years of unparalleled exertion on the part of all Christian people, they were still as far from the realization of their grand object as ever.

But though the movement resulted so disastrously, its incidental consequences were of the highest value. Intellectual improvement and a higher civilization were the fruit of the beneficial influence of these vast operations. Before dismissing the subject, we call attention to the scenes from the crusades represented on our plates. *Pl. 36, fig. 2*, departure of a company of crusaders for Palestine; *pl. 37, fig. 1*, battle between the crusaders and Saracens; *fig. 2*, harangue to the crusaders before the gates of Jerusalem; *pl. 38, fig. 1*, crusaders returning to Europe; *pl. 39, fig. 1*, ground-plan of the church of St. Mary of the Manger. This building stands near a strong cloister of the Franciscans, in Bethlehem, and is the oldest church in Palestine. A little stone grotto within its walls is pointed out as the place where the infant Saviour was born. *Fig. 2*, interior of the same church, with the entrance to the holy grotto; *fig. 3*, the chapel containing the grotto, and constantly lighted by thirty-two lamps; *fig. 4*, ground-plan of the church of the Holy Sepulchre at Jerusalem; *fig. 5*, its portico and main entrance; *fig. 6*, interior view of the part under the cupola, exhibiting the chapel with the Holy Sepulchre. The whole is properly divided into four churches: that of the Holy Sepulchre; the church of the Crucifixion, lying to the south; at the eastern end the partly subterranean church of the Recovered Cross; and lastly, the chapel at the northern end, marking the spot where Mary Magdalene first noticed the fact of the resurrection. The light penetrating through the dome falls directly in the chapel of the Holy Sepulchre. The entire diameter of the chapel is about thirty feet, but after deducting the enormous thickness of

the walls, the chamber containing the tomb is not more than about seven feet by six. Another small chamber, called the chapel of the Angel measures about ten feet square. The walls are relics of the rock which surrounded the grave of Christ. The walls of the chapel of the Holy Sepulchre, especially, are of rough limestone, coated externally and internally with marble. The interior is illumined by golden lamps.

III. ETHNOLOGY OF THE PRESENT DAY.

PLATES IV. 1-42.

INTRODUCTION

As in the selection of representations of people of the present day, regard is had less to historical relation than in those referring to earlier ages, we follow the same plan in the explanatory text, and devote our attention less to the history than to the character, and manners, and customs of the people. Nevertheless, before we pass on to particular descriptions of individual nations, we must be permitted (with a reference to *pl.* 1) to premise some remarks upon the fundamental types of the Human race.

Assuming the fact that all men are the descendants of one common ancestral pair, it cannot be denied that the numerous stocks differ from each other not only in language and habits, but also in certain physical characteristic marks, which also pass by inheritance without change, from generation to generation, when not modified by the intermixture of different stocks; so that, however different they may appear, they may nevertheless be traced back to a few types. Conformably to these types, therefore, naturalists have divided mankind into a greater or less number of races, according as they assumed a greater or less number of such types. Cuvier establishes but three races; and as we have already spoken fully of them under the head of Anthropology, we will here recapitulate only the more important points.

The *Caucasian race* is characterized by the beautiful oval of the head, the ample and prominent forehead, and cheek-bones but slightly or not at all projecting. The ears are small and sit closely, the teeth stand *vertically*, the jaws are moderately strong, the chin is well formed. The hair and complexion vary greatly; the former, however, is generally long and smooth, more rarely curled.

The *Mongolian race* is characterized by a large head elevated at the crown, as also by projecting cheek-bones, flat broad face, small and obliquely set eyes, imperfectly opened eyelids, flattened nose with wide nostrils, large, broad ears, wide mouth, teeth standing straight, almost beardless face, and smooth black straight hair. The color of the skin is yellowish or olive-brown.

The *Negro race*, finally, has a head laterally compressed, with large

projecting jaws, whose alveolar margin slopes towards the front, by reason of which the teeth have an oblique direction. The forehead is small, the cheek-bones and arches of the temporal bones prominent, the lips protruding, nose flattened, and nostrils wide; hair mostly woolly, and matted together like felt, sometimes curled, or straight and long; beard generally thin and bristly. Complexion black to yellowish brown. Cuvier distributes the different stocks of mankind amongst these three races in the following manner :

| | | | | | | |
|---------------------------------------|---|---------------------------|-----------------------|------------------|---|------------------------|
| <i>Caucasian Race.</i> | { | Armenians. | { | Asyrians. | { | Chaldeans. |
| | | | | Arabians. | | |
| | | | | Phœnicians. | | |
| | | | | Hebrews. | | |
| | | | | Abyssinians. | | |
| | | Egyptians ? | | | | |
| <i>Caucasian Race.</i> | { | Indians. | { | Sanscrit Stock. | { | Ancient Per- sians. |
| | | | | | | Hindoos. |
| | | | | Pelasgian Stock. | | Celts ? |
| | | | | | | Greeks. |
| | | | | | | Latins. |
| | | Gothic Stock. | Germans and Dutch. | | | |
| | | | English. | | | |
| | | | Danes and Swedes. | | | |
| | | Slavonic Stock. | Russians. | | | |
| | | | Poles. | | | |
| | | | Bohemians. | | | |
| | | | Wendes. | | | |
| <i>Caucasian Race.</i> | { | Scythians and Tartars. | { | Parthians. | { | |
| | | | | Turks. | | |
| | | | | Finlanders. | | |
| | | | | Hungarians. | | |
| | | | | | | |
| <i>Mongolian or Altaian Race.</i> | { | Calmucs. | { | | { | |
| | | Kalkas-Mongols. | | | | |
| | | Mandchus. | | | | |
| | | Japanese and Coreans. | | | | |
| | | | | | | |
| | | Siberians. | Samoyeds. | | | |
| | | | Laplanders. | | | |
| | | | Esquimaux. | | | |

| | | |
|---------------------------------|---|----------------------------|
| <i>Negro or Ethiopian Race.</i> | { | Caffres. |
| | | Foulahs. |
| | | Mandingoes. |
| | | Fellatahs. |
| | | Hamburas. |
| | | Madagassees. |
| | | Negroes of Central Africa. |
| | | Hottentots. |
| | | Bushmen. |

Cuvier, on account of their unmistakable conformity, appears inclined to include the American stocks in the Mongolian race. These stocks may be reduced to the three following :

1. *Columbian Stock.* Inhabitants of the plains from the river St. Lawrence to the eastern coast of Mexico, the Antilles, Terra Firma, Guiana, the district of Cumana, and the Canada Indians, the natives of Yucatan, Honduras, the Caribbee Islands, &c.

2. *American Stock.* Inhabitants of the plains on the Upper Orinoco, on the River Amazon, of Brazil, Paraguay, and of the interior portions of Chili.

3. *Patagonian Stock.* Natives of Patagonia.

Australia, to which besides New Holland, the whole Indian Archipelago or Polynesia, and the Islands of the South Sea or Oceanica belong, possesses no peculiar human population ; all these races are here associated. To the Australian Caucasians belong the Malays in the Indian Archipelago, the inhabitants of the Marian, Caroline, Friendly, and Society Islands, those of New Zealand, of the Pelew, Sandwich, Marquesas Islands, &c. The Australian Mongolians likewise inhabit the Carolines, the Nicobars, and New Guinea. Finally, to the Australian Negroes belong the New Hollanders, Alfureses, the Endamenians in New Guinea, and the Papuans.

Pl. 1 gives a view of the Australian races, while upon the same plate different stocks of all three races are represented. At *fig. 1* we perceive a *Central European* in the costume of the higher classes, and of the true Gothic (Teutonic) stock, which manifests itself in its purity in the blue eyes, light hair, white complexion faintly tinged with red, and tall stature, with the dress fitting, for the most part, close to the body.

Fig. 2. A *Greek*, in the Palian dress, belonging to the Pelasgian stock. The skull of the Greeks, who constitute the type of the last named race, is very well developed ; the forehead rises in a bold arch ; and the arch of the anterior portion of the skull, when seen from above, entirely conceals the face, so that the facial angle is one of almost 90 degrees. The face is small, with a rounded contour ; and all the parts are in beautiful harmony with each other. The hair of the Greeks is dark and smooth ; the complexion white, more or less tinged with olive, or dull brown ; the eyes are large, overshadowed by the eyebrows, which more resemble a cross-line

than a true arch; the nose is straight, or nearly aquiline, is continued in a single right line from the forehead with only a small depression between the eyes; finally, the stature is of middle size.

Fig. 3. A Turk, in the ancient national dress. The Turks have been referred by most authors to the Tartar stock. This has a vigorous and athletic form, somewhat short and crooked legs, dark, olive-colored complexion; the upper part of the face is broad and flat, the eyes are small, deep-sunken, and standing wide apart, the eyelids thick; the nose is much depressed, and the nostrils conspicuous; the hair is long, straight, and black; the eyebrows are bushy, and the beard (especially upon the upper lip) is thick. The Turks are undoubtedly a hybrid people derived from the Tartars and Mongols, having, however, received noble forms through their later intermixture with the Mingrelians, Georgians, Circassians, and Greeks. Their forehead is straight, and does not stand out so boldly as with the Greeks; still it is beautifully formed. The eyebrows and the depression between the eyes are conspicuous; the nose is long and aquiline, running out in the same direction with the forehead. The eyes, which are large, are placed wide apart, and the inner and outer corners stand at the same height. The upper lip is short, the chin full, but the distance of the chin from the angle of the lower jaw very trifling. The countenance seen in front is long, and becomes small below the tolerably prominent cheek bones. Viewed from the side, the line from the forehead over the nose to the chin is perpendicular, as the facial angle amounts to 90 degrees or thereabouts. The beard is full and flowing, the expression of the physiognomy serious and dignified. The skull of the Turks has a globular contour, and the posterior foramen magnum, which is large, is situated near the hinder part of the base of the skull.

Fig. 4. A Cossack of the Don. The Cossacks of the Don and the Volga, belonging to the same stock, appear nevertheless to have proceeded from an intermixture of Tartars with Slavonians. The orbits of the skull of the Don Cossacks are very deep, broad, and placed low down; the orifice for the nose is wide; the superciliary arches jut out boldly, and meet in the space between the eyes. The branches of the lower jaw are divergent and uneven, by reason of the prominence of the masseters. The posterior foramen magnum is narrow, the occipital bone is very thick, and the whole skull possesses a marble-like density and polish.

Fig. 5. A Persian of the higher ranks. The Sanscrit stock, to which the ancient Persians are referred, is of middle height, or under, of delicate, slender figure, with straight, handsomely formed nose, mouth of moderate size, thin lips, and round chin. The cuticle is usually somewhat yellow. The hair is long, black, fine, and glossy. The skull is of a light, delicate structure, nearly round, with prominent occipital and small cheek bones. The modern Persians exhibit many of the peculiarities of the Armenian (*Semitic*) branch, to which belongs the Arab (*Bedouin*) represented at *fig. 7*. This branch has an oval face, with a pointed chin, a high forehead, an aquiline nose, large dark eyes, arched eyebrows, well formed mouth, and long black hair, characteristics which are most distinctly impressed upon

the Arab. The *Cabyles*, that is the *Berbers*, in Algiers and Tunis (*pl.* 1, *figs.* 8 and 9), likewise belong here. They are also denominated *Dshebalis*, *i. e.* inhabitants of the mountains, by the people of the Arabian-Moorish cities; in Tunis they are also called *Suaves*. They are a handsome race of men, allied in their manners to the Bedouins.

The *Hindoos* (*fig.* 6, a Hindoo of the citizen class) have a stature of moderate size, or below the medium; their complexion is yellow, with a tinge of bronze color. Their form is delicate and slender; the nose straight and handsomely moulded, never flattened down, never with widespread nostrils; the mouth is of moderate size, the lips are thin, the chin round and usually dimpled, the eyes large, with arched eyebrows and long eyelashes. The iris is generally black, the white of the eye passes into yellow; ears of moderate size and beautifully formed: hands and feet small; skin thin; hair long, black, fine, and glossy; beard scanty, except on the upper lip.

The *New Zealanders*, who belong to the Australo-Caucasian stock, and one of whom is represented at *fig.* 22, we shall treat of more fully hereafter.

The stocks represented at *figs.* 10—13 belong to the Mongolian race. The *Calmucs* (*fig.* 10, a Calmuc in war equipments) have usually thin, lean limbs, a slender body, and a short neck. Their pre-eminently characteristic feature, however, consists of the obliquely placed eyes, whose inner corner descending to the nose, is a little open and fleshy. The eyebrows are black, thin, and form low arches; the nose is generally flattened and depressed towards the forehead; the cheek bones project in front; head and face are round, lips thick and fleshy, chin short, teeth very white, remaining beautiful and sound to an advanced age. The ears are very large, and project. The peculiarities of the skull of the Mongolian race are, the globular form of the cranium, the flatness and width both of the forehead and face, and the boldness of the arches of the temporal bones. The orbits of the eyes are large, but the superciliary arches are not well defined. The alveolar process is obtusely arched in front, and the chin somewhat projecting. The *Chinese* also (*fig.* 11) are of Mongolian origin; at least Davis supposes, that in ancient times a colony from India settled in China, and mingled with the aborigines and rude Mongols. The small eye, elliptical at its nasal angle, is peculiar to the Chinese as well as the Tartars; both also have the same pointed chin and prominent cheek bones. Their color is more or less brownish yellow, according as the people are exposed to the influence of the climate; limbs well proportioned, but the head large; beard weak; hair straight, smooth, coarse, and always black. To the Mongolian race belong also many tribes which inhabit the wilds of Siberia, northwards from the Altaian chain to the coast of the Arctic Ocean; the inhabitants of Corea, Kamschatka, and the adjacent Aleutian Islands; the Tungusians, Samoyedes, and Ostiaks, as well as the Greenlanders and Esquimaux of North America. At *fig.* 12, we give a representation of a *Samoyed*, and at *fig.* 13, one of an *Esquimaux*. The hair of the Samoyedes is long, harsh, and black; the

face flat and broad; the cheek bones prominent; the eyes long, with narrow openings, and oblique; the nose depressed; the mouth large; the beard very thin; the complexion dark brown; stature small, frame stout, and the strong lower limbs appear disproportionally short. The Esquimaux, again, have high cheek bones, broad forehead, flat face; eyes with narrow fissures, long lashes, and so small that the white is scarcely visible; a large mouth; flattened nose; dark yellow or brown complexion, and straight black hair. The men are of medium stature, or small, but stout; the hands and feet are small.

Besides these last named people, America offers us an indigenous population, which is divided into many tribes and very numerous stocks, extending from the northern latitude of the Polar Circle to Terra del Fuego in the south. Of these we have represented, at *fig. 17*, a *Charrua Indian*, *figs. 19 and 20*, *Crow Indians*, and *fig. 21*, a *Californian*. The Indians have in general a vigorous, broad, though not tall form. The chest is broad, the neck short and thick, the abdomen very prominent; the lower part of the thigh not powerful, the calves especially thin, but the arms round and muscular. The foot is small behind and very broad before; the great toe is separated from the others; the hands are almost always cold, and the fingers, comparatively speaking, thin; the nails are very short; the color of the skin is copper-red. The children are, however, yellowish, like mulattoes; sick persons are brownish-yellow; the darkness of the complexion is also more decided in those who are especially vigorous and active, and live much in the open air. Their skin is fine, soft, and shining; and when exposed to the sun, much inclined to perspire. The long, coarse, straight, glossy hair hangs down in thick tangled masses. The beard of the men is generally thin; with some, however, thick. The crown of the head and the cheek bone are broad, corresponding with the breadth of the chest; the forehead is low; the temples are prominent, narrow above, and very retreating. The occiput does not hang so low down as with the Negro. The face is broad and angular, and projects much less than in the Negro, but more than is the case with the Calmucs and Europeans. The small, neatly shaped ears turn somewhat outwardly. The eye is small and dark brown, placed slanting, and turned towards the inner corner of the nose; the eyebrows are thin, and very high in the middle; the nose is short but depressed, broad below, and not turned up so much as with the Negro; the wide nostrils are but little prominent; the lips are not so thick and prominent as is the case with the Negro, and the mouth is smaller and more compact; the teeth are white, and the incisors very broad and even, the eye-teeth projecting. From all this it follows that the Indian bears a greater resemblance to other races, especially the Chinese and Calmucs, than to the Negro. The Charrua Indians of Buenos Ayres, below the 40th degree of south latitude, are almost black, and without any mixture of red. The *Osage Indians* (*pl. 1, fig. 18*) have their villages on the head waters of the Osage and the Verdigris, one of the northern tributaries of the Arkansas. They have relinquished a part of their territory to the United States, and are still, even at the present day, a numerous and powerful nation, which

wages war with all its neighbors. The *Raven*, or *Crow Indians* (Crow, or Upsacoka nation), are a nomadic tribe, south of the Missouri, between the Little Missouri and the south-eastern branches of the Yellow Stone River. The *Indians of New California* are of a savage appearance, and of a very dark color. Their flat, broad face, lighted up by large wild eyes, is thickly overshadowed by long black hair.

Of the *Negro* race, *fig. 14* represents a *Guinea Negro*; *fig. 15*, a *Boussa negro*; *fig. 16*, a *Hottentot*; and *figs. 23 and 24*, *Papuans* of East Australia and Van Diemen's Land. The black stocks of South Asia and Australia, for the purpose of distinguishing them from the negroes, negritoes, or Australian negroes, have been denominated Papuans, after a Malay word, which signifies woolly-haired. The natives of the north-west coast of New Guinea bear, more especially, the latter name. We distinguish also true Papuans from the mixed, with whom we rank those which maintain a position about midway between the true Papuans and the Malay settlers. The figure of the *Papuans* is handsome; their exterior indicates strength and agility; their skin is dark brown, tinged with yellow; the nose somewhat flat; the mouth large; the whole form of the face tolerably regular. The hair is generally curly, close, and very thick. Some stocks of New Guinea, New Britain, and new Ireland, allow it to hang down upon the shoulders in long, straggling ringlets; with others it stands on end, thus giving the head a monstrous circumference. The Papuans go entirely naked, and ornament their shoulders and breasts with incisions in straight or crooked lines. There prevails also amongst them the custom of covering their heads with a mixture of grease and ochre, which reddens the hair and entire face. In the inhabitants of Tasmania, or Van Diemen's Land, the characteristics of the Papuans have degenerated. Their hair is decidedly woolly; the nose broad, the nostrils widely expanded; the mouth is large; the cheek bones very prominent; the eyes long and narrow; the lower part of the face is larger than the upper part, and the color is dull black.

The *Boussa negroes* are a negro stock, belonging to the Eyeoes, who inhabit the southern part of the kingdom of *Houssa*, on both sides of the Quorra Niger, this kingdom being under the dominion of the Fellatahs of Saccatoo. Our plate (*pl. 1, fig. 15*) represents the King of Boussa, showing the features of the face to be very regular, the lips also not so thick as we usually find to be the case among the negroes. The Eyeoes, moreover, trace their origin from Bornou. Most of the *Guinea negroes* exhibit all the characteristics of the negro race. Their skin is thick, like velvet to the touch, and secretes a perspiration of an unpleasant odor. The color is black, and the crisp, woolly hair is also generally of the same hue. But the stocks living between Cape Palmas and Cape Three Points (Ivory Coast), as well as those of the country extending from the latter cape to the Rio Valta (Gold Coast), to wit, the Quaques, Buntakees, Ashantees, Fantees, Intas, &c., have very little of the negro physiognomy; on the contrary, more of the Indian, or almost regularly Grecian style of features.

The *Hottentots*, according to Barrow, are well proportioned and straight;

have forms rather delicate than muscular; their joints and limbs are very small; countenance ugly, but differing, in this respect, in different families. Some individuals possess very flat noses, others have them quite prominent; their eyes are dark chestnut brown, long with narrow openings, widely separated, with the inner angles rounded as in the Chinese, to whom, generally, the Hottentots have much resemblance. The cheek bones are high and prominent, and with the small pointed chin, form almost a triangle; the teeth are white. The young women are well and pleasingly formed; the breasts are unusually large, and the bosom very full; but soon after the birth of the first child, it becomes flabby, and in old age very pendulous. The abdomen swells out, and the hinder part is covered with a thick mass of pure fat. Burchell describes them in a similar manner. "The hands and feet," says he, "are small; the eyes so oblique that transverse lines drawn through the angles do not converge upon the same plane, but sometimes intersect half way up the nose; the face between the two cheek bones is flat; the ridge of the nose is scarcely perceptible, but the end is broad and flattened; the nostrils diverge; the chin is long and projects in front: the small size of the lower face is also a characteristic of the race." The hair grows in small crisp knots, tufts, or long rope-like locks, which stand apart from each other at certain distances, and cannot be penetrated by a comb. The complexion is of a yellow leather color, or pale yellowish brown. Sparrman compares the hue to that caused by the jaundice.

THE PEOPLE OF EUROPE.

In Europe there are twenty different stocks of people, all of whom, however, except the Lapps, Finns, and Calmucs, who appertain to the Mongolian race, belong to one race, the Caucasian. Three of these stocks are distinguished as well for their intellectual cultivation as for their numbers and power. The first is the Græco-Latinic, to which belong the Arnauts, Albanians, Wallachians, Greeks, Italians, French, Spaniards, and Portuguese; who speak languages derived from the Greek and Latin; exhibit graceful, unconstrained movements; have black eyes, black hair, brown complexion, and sharp, distinctly marked features; are lively, ardent, courteous, but generally fickle and frivolous, easily influenced by the passions, and indefatigable in their efforts towards the gratification of their wishes and desires. They are, nevertheless, temperate in eating and drinking. Peculiar circumstances have, moreover, here and there called forth a deviation from these traits; thus, for example, the inhabitants of Andalusia and Algarves have an African tincture, through their contact with Arabs and Moors: the fiery Spirit of the Belgians and Northern French has become somewhat tempered by the admixture of Celts and Germans; and the Greeks, through their contact with Slavonia, approach somewhat to the disposition of the Slavonic stock. These Græco-Latinic people, moreover, inhabit the southern islands and peninsulas of Europe, France, and Belgium

the greater part living in the volcanic region on the Mediterranean Sea. The religion is the Roman and Greek Catholic.

The second large stock of people is the Germanic or central, of a powerful frame, with less sharply marked features; hair mostly blond; blue or grey eyes; a more sedate, firm carriage, and a fixed ease of manner. In an intellectual point of view, it is distinguished by tranquil reflection, strong reasoning powers, deep, quiet feelings, firmness, candor, absence of southern duplicity and falsehood, as well as by indefatigability in labor. The people of this stock have a fondness for spirituous liquors. The languages are the Germanic, and the religion chiefly Protestant. Here belong the people of Germany, Holland, Denmark, Scandinavia, and England, for the most part living upon the central chain of mountains and upon the North Sea and Baltic. The English and Dutch, by reason of their maritime commerce, have acquired a character somewhat different from the above. Finally the Slavonic or Oriental stock, which inhabits Russia, Poland, and non-German Austria, professes in general the Greek religion, and speaks the Slavonic languages. The frame is muscular, the physiognomy coarse, savage, and expressive of sensuality. The spirits are easily elevated or depressed; the will strong; the imagination seldom very lively. The people of this stock have a hankering after solid food; in abundance they readily indulge to superfluity, but are capable also of enduring a long abstinence. Susceptible of high development by civilization, they are degraded by tyrannical treatment to a state little higher than that of beasts. Polish men of rank have become refined in their manners through western civilization; the common people, on the other hand, are still quite rude.

The remaining smaller stocks in Europe are:—(1) The Iberians or Basques, in Spain and France: (2) the Celts, including the true Celts, in Ireland, the Highlands of Scotland, and upon the Isle of Man; the Welsh (*Cymri*) in Wales, and the Bretons in France: (3) the Tschudes (Uralians), the Finns, Esthes, Lapps, Tcheremisses, Tchuwaches, Watiaks, Kumans, Udi, Woguls, and Magyars (Hungarians): (4) the Samoyedes, in the polar regions: (5) Turks—Osmanni, Turcomans, Baschkirs: (6) Calmucs: (7 to 14) the inhabitants of Caucasus, with Avari, Kasikumuks, Akooches, Koorahs, Circassians, Abassians, Mizchegis, and the Ossetes (Bucharians): (15) the Semites—Jews and Maltese: (16) the Hindoos, or rather the Zigeuni (Gypsies) descended from them: and (17) the Armenians.

In our short description of the inhabitants of Europe, after having first treated of Germany, including Austria, Prussia, and Switzerland, we will from thence pass on to Denmark, Sweden, and Norway (Scandinavia.) Taking up, next, England, Ireland, and Scotland (Great Britain), we will then turn to Russia, go through the whole of Eastern Europe, not forgetting the nations of Asiatic Russia, and finally visit Turkey, Greece, Italy, Portugal, Spain, and France.

The German People.

The German people live along the Rhine, the Weser, Elbe, Oder, and the upper Danube, in a dense mass. Further over beyond this natural district the Germans have mixed with other European stocks: thus, towards the East, between the Oder and Vistula, with the Slavonians; towards the Adriatic Sea, with the Slavonians and Latins; towards France, with the Franco-Latins. Within the limits above mentioned the pure German genius now displays itself; not animated, indeed, by southern fire; distinguished by no elasticity of disposition nor of character; by no nicety of taste; but which, nevertheless, is elevated above that of other people by many other fundamental traits. One of these distinguishing characteristics is the love of liberty, which, no matter how oft it may be smothered, always burns again afresh. To this is joined a strong moral sense, from which proceed a deeply implanted love of truth and rectitude, unshaken fidelity, veneration for the female sex, attachment to the ruling princes, which qualities are dignified by the religious fervor pervading all the feelings of the Germans. Another characteristic of the Germans is their profoundness of thought and love of research. The effort to discover new things and improve those already known to them proceeds from this, as well as the propensity to travel, which carries the German into foreign lands, where he, by his versatility of mind, easily accommodates himself to what is strange, and adapts foreign habits to his own disposition. To conclude, steadfast courage, great perseverance, and cheerfulness are associated with these characteristics of the German.

Diverse as is the configuration of the soil of Germany, so different also are her stocks of people, in their external appearance, their occupations, their manners, and their language; although the German fundamental traits above referred to always predominate. The Germans are generally divided into two principal groups: in the north they are large and fair; in the south, somewhat smaller and darker. Their language is divided into the soft sounding low or broad German, the harsh middle German, and the sharp sounding high German. In religion, science, and art the Germans stand upon a high, if not upon the highest eminence; as respects husbandry and industry, Germany rivals other lands; her commerce, also, is in a flourishing condition.

After these general characteristics of the Germans, we will consider more closely some German stocks of people, with reference to *Plates 2 and 3*.

Wurtemberg and Baden. In general the inhabitants of Wurtemberg and Baden are strongly built and well formed; the handsomest and healthiest of them are found in the Schwarzwald (Black Forest), and in some of the north-western valleys of the province of Alp, especially in the hilly parts, and also in a few small districts of the lowlands. Their kindly disposition is characteristic, and attendant on this a quiet, domestic, industrious, honest, religious feeling, a conscientious thoroughness, heartiness, poetical turn of

thought, and enthusiasm. Wirtemberg is the heart of ancient Suabia. The Suabian dialect, in a more restricted sense, however, prevails between the Schwarzwald and the river Lech, and from the Allgau Alps to the river Kocher, or in the greater part of Wirtemberg, and beyond the latter, as far as Augsburg. The people of Baden are esteemed industrious, faithful, sincere, honest, and brave in war. The inhabitants of the Schwarzwald exhibit, in the highest degree, the simplicity and honesty of the German stock. They are sensible, enduring, frugal, temperate, modest, and very religious; they are lively and cheerful; in many places, indeed, also brawling and quarrelsome; in others, on the contrary, of very peaceable disposition.

The inhabitant of the Odenwald is, with all his poverty, cheerful and hospitable. He lives quietly, and thinks much and freely. The people of the Rhine valley are represented as well formed, sensible, laborious, and neat. They are quicker and apparently more enlightened than the inhabitants of the mountain forests, but neither so frugal nor altogether so correct in their morals. Here, again, great differences are exhibited in character, which varies according to the configuration of the country. The Wirtemberg peasant is accused of an extravagant refinement in customs and mode of life, and especially of abandoning his national costume, particularly in the neighborhood of the towns. To the costume of the Wirtemberg peasant belong, more particularly, a triangular hat, worn upon the smoothly combed hair; also a comb in the hair; a warm smock-frock, with polished metal buttons; shoes with buckles; a kind of bodice; red stockings and high heels.

Our plate represents, in the first place, a peasant girl of the district of Furtwangen in Baden (*pl. 2, fig. 1*). She has on a narrow-brimmed straw hat, a black jacket over a red bodice adorned with blue ribands, and a white apron embroidered at the bottom over a black and red striped petticoat. The stockings are red.

Fig. 2. A shepherd of Hauenstein, in the highland of Baden. His hat is turned up at the sides, and ornamented with a black riband and a buckle; above a red undercoat, bordered at the top with black, he wears a short black sack coat; the breeches are short, black, and gathered up in puffs in several places; the stockings are white.

Figs. 3 and 4. Schwarzwald tavernkeepers, from the region about Schramberg. The dress of the man is black as far down as the stockings, which are white, the waistcoat being bordered with red. The woman has a peculiar, high, black lace cap, with broad ribands, a yellow stomacher, cinnamon-colored jacket, red apron, and blue petticoat. The stockings are grey or white.

Figs. 5 and 6. Male and female peasant of the district of Reutlingen, in Wirtemberg, engaged in making hay. Both the man and woman have on black caps. The woman wears a riband with a medal around the neck; the bodice is peach-blossom colored, with double broad green trimming above and black lacings below. The chemise sleeves are wide, petticoat blue with a yellow border; stockings and apron white. The man wears short yellow leather breeches and a long white

loose coat, over a black waistcoat, mounted with many metal buttons ; over the shirt, however, he wears colored suspenders.

Figs. 7 and 8. Bridal party from Fullheim, in the district of Tuttlingen, in Wirtemberg. The entire dress of the bride is black, with a red bodice, over which blue ribands are laced. Stockings red. A coronet covers the head, and from the long plaits of hair ribands hang down to the ground. The bridegroom has a triangular hat, blue breast straps, with trimming over the white shirt, over that a waistcoat with many buttons worn open, and a cinnamon colored jacket. Breeches short, stockings white. Both bride and bridegroom wear a nosegay of flowers at the breast, and the latter one also in his hat.

Fig. 9. Female flaxbreakers from the Steinlach valley, in Wirtemberg, district of Tübingen. The foremost with black dress, the frock bordered with green, the apron blue, neckerchief red, cap trimmed with broad lace. The hinder one with a green bodice, pink breast-bands, blue apron, red frock, and black cap upon the head ; chemise sleeves white.

The Bavarians. Three stocks of people may especially be distinguished in Bavaria ; namely, the Old Bavarian, Franconian, and Suabian, which differ from each other very much in character, dialect, and customs ; but all bear the South German stamp. The Old Bavarians have a strong-boned, muscular frame, but are rather stout than tall ; they are of a cordial, kind disposition, strongly attached to what is ancient, religious, devoted to their priest, and obeying him submissively ; not unfrequently very superstitious withal. They are a robust, stout people, very quarrelsome, but brave in battle ; often reproached with sensuality and want of cleanliness and industry ; although it is conceded that their heart is right, and needs only proper education. The fashions of dress in the highlands differ from those in the plains. The highlander wears the usual dress of the inhabitants of the Alps : the pointed hat, the short breeches with Alp-stockings, the suspenders with breastbands, and the short, wide coat ; sometimes waistcoat and long coat are worn. The female dress is seldom becoming, as a sort of man's hat, or a great fur cap, or a handkerchief, usually covers the head, and the jacket is not particularly neat. At a greater distance from the Alps, in the towns of Old Bavaria, the female attire is much neater. A small silver-lace cap, which only covers the black hair, and a dark bodice, laced in front with silver chains and adorned with glistening medals, constitute the principal finery. Midway between the Old Bavarian and the Franconian stands the inhabitant of the Upper Palatinate. The Franconian is distinguished from the Old Bavarian by greater liveliness, a finer taste for the arts, active industry, more zeal for political liberty, greater cheerfulness ; in a word, more elasticity both of mind and body. On the other hand he is justly reproached with an excessive fondness for beer.

At *figs. 10 and 11*, male and female peasants of the district of New Ulm, are represented as they are coming from the fair. The coat of the man is brown, waistcoat and breeches black, suspenders pink, waistcoat and coat mounted with polished buttons. The woman has a black jacket, black

apron, light blue petticoat with a dark border, and over the white bodice pass pink ribands. The black cap, which covers the hinder part of the head only, is tied under the chin with broad ribands of the same color.

Pl. 2, fig. 12. An Upper Bavarian woman of the citizen class, distinguished by the head-dress, the short bodice adorned with chains and coins, and a pocket with a clasp attached to the side.

Figs. 13 and 14 represent women of Dachau, in Upper Bavaria, having peculiar black lace caps, with large bows of riband above, and surrounded by a broad red riband. The jacket of the one is very short, red, with white cuffs and border; around the neck is worn a black riband with a shining metal clasp; chains and coins likewise adorn the bodice; the petticoats hanging in long folds are black, bordered with red, and the aprons blue.

Fig. 15. A man from Lake Schlier, in Upper Bavaria, with the sugarloaf hat of the inhabitants of the Alps, the brim, however, being small. The short grey coat is turned up with green, and the short black breeches are also trimmed with green. The stockings extend only to the ankles, as the shoes worn in the Alps cover the bare feet.

The Hessians. Arndt, in his "Essay upon the Comparative History of Nations," describes the Hessians in the following manner: "The opposite of the Thuringian is his neighbor the Hessian, the descendant of the ancient Catti, who occupies Lower Hesse of the present time, between the Taunus and Rhön mountains on the south and east, and the bend of the Weser, where the Fulda flows into that river, the district of Fulda, the greater part of Nassau and Waldeck, and a portion of Paderborn. The Hessian of the present day, and the inhabitants of Nassau and of Fulda, as well as the Friesian of the coasts of the North Sea, and the Saxon of Westphalia, of the Weser and Leine, as far as the western Hartz, have preserved their Germanic purity from all foreign admixture. The Hessian bears the stamp of his purely German extraction in his marked traits of character and peculiar manners, which still call to mind the description of Tacitus. He is nicknamed the blind Hessian. This word blind, however, denotes no defect, but a fixed, firm, immovable manner, which is subject to no changes and variations; it indicates the quiet, firm courage, with which the Hessian with his eyes open, as another with them shut, goes to meet danger and death. Tacitus highly extols the valor and military skill of the Catti, in which they were distinguished above all their countrymen and neighbors. A gravity and tranquillity of manner altogether peculiar marked these splendid men. Nowhere in Germany are the men so little inquisitive and talkative." Arndt, however, considers the Hessians here only in their narrowest limits; by extending the boundaries, we find that the Franconian stock predominates, comprehending also the Lower Saxon and Thuringian. French and Netherlanders have also come in among them. In Electoral Hesse, the Franconian stock is spread over Upper Hesse, the greater part of Lower Hesse, and over Fulda and Hanau; the Lower Saxon is spread over the circles Hofgeismar and Schaumburg, and the greater part of the circle Wolfshagen; the Thuringian is found in the

Werra valley and Schmalkalden. In general, true and upright, active and industrious, the Lower Hessian, on account of the advantages he possesses, in numerous towns as well as land and water communications, is inclined to the pursuit of a stirring, active business life ; whilst the Upper Hessian devotes himself chiefly to agriculture. He is not inferior in integrity and industry to the Lower Hessian, excels him even in perseverance, is more straightforward in his manners, and generally more wealthy. He is distinguished by his stout frame and plain mode of life, and is ardently attached to ancient customs, thus preserving a strongly marked nationality. He still wears, for the most part, the white smock-frock, hat with flap bent downwards, and short breeches. The dress of the women is either entirely black, or fancy colored, with a peculiar small, double cap, and two long plaits of hair falling down the back ; they wear a closely-fastened bodice, lying in small folds, with short tight sleeves, over which frequently fall down abundantly wide ones ; a snow-white chemise, seen under these sleeves ; a breast-piece, richly embroidered with gold ; a petticoat with hundreds of gathers, reaching only to the knee ; shoes with high heels ; and on festive occasions they add a little mantle, which is hung upon the head, and which reaches only to the shoulders. The native of Schwalm wears a hemispherical red or green velvet cap, which is bordered with fur, and trimmed with gold lace ; in winter this is exchanged for one of a cylindrical shape. Not unfrequently also the married man wears a triangular hat, especially when he goes abroad into the field. The waistcoat, mounted with many small metal buttons, is bright red ; the coat and breeches are of fine white linen. The female dress is richer ; it consists of a neat cap, trimmed with red and embroidered in fancy colors ; a string of coral around the neck ; a bodice of blue cambric, with short sleeves turned up at the elbows and richly ornamented with lace. Over the latter is worn a black corset, and upon the breast lies a black breast-piece, embroidered with gold and silver pearls and silk. From the hips depend eight to ten short skirts, the uppermost of which is black, the others bordered with gay colors. Every skirt is a little longer than the next outer one, the innermost being the longest, extending, however, only to the knee. The chemise, which peeps out below, is provided, moreover, with a hem of a hand's breadth. The stockings are of linen, and furnished with cotton clocks ; and the shoes have high heels. On extraordinary occasions the "schappel" (chaplet), a head-dress which is wrought of flowers, gold spangles, &c., and sits upon the head in the manner of a tiara, takes the place of the cap. Maidens only are permitted to wear fancy colors. The peasant of Fulda wears a green or blue linen coat, and a furred cap or broad-brimmed hat. The picturesqueness of the female dress is heightened by the long hair being wound round the crown of the head, and fastened in the middle with a neat wooden pin. The people of the Grand Duchy of Hesse are a peaceable nation, but by no means deficient in courage when the occasion demands. The natives of Rhenish Hesse are particularly lively and quick in their movements. The inhabitant of the highlands displays more distinctly and strongly marked peculiarities than the lowlander ; he is rude, more

laborious, frugal, active, and industrious. The inhabitant of the Odenwald is vigorous and energetic in bodily labor, good natured, tender hearted and obliging, and possesses a strong sense of right. The people of Vogelberg and Hinterland are a strong race of men, possessing a courageous disposition, great uprightness, honesty, and complaisance, and are as yet but little acquainted with depraved manners and habits. On the other hand, their minds are not as highly cultivated as those of the people of the lower districts, the Bergstrasse, the regions on the Rhine, and especially Rhenish Hesse. The inhabitant of the Odenwald formerly wore a large comb, going entirely round the hinder part of the head, a turned up triangular hat, a green cowl, light blue waistcoat, woollen stockings with garters, and shoes with large buckles. At present the green cowl is rarely seen, and instead of this there is a long coat of dark blue cloth with a single row of buttons. The women have retained their old fashions tolerably well, and wear a dark blue cloth jacket, bordered with white; a long frock of the same material with numerous folds; a cap of black calico, which is trimmed on both sides and above with pearls; white or blue woollen stockings, and shoes with ribands.

In *pl. 2, figs. 16 and 17*, are represented an Odenwald female, and also a male peasant, from the district of Heppenheim, in the Grand Duchy of Hesse.

The inhabitants of Rhenish Prussia differ very much from each other in descent and manners; in general, however, what Duller says of all the people living along the Rhine, may also be said of them. "The Rhine," says he, "exercises its powerful charm upon all the men who live near it, or indeed in the districts watered by it. However different the employments may be (agriculture, especially the cultivation of the vine, and manufactures), influencing variously those who follow them; however decided the religious feeling in all (no matter whether of the Roman Catholic or Lutheran creed), the ever fresh enjoyment of life is the Palladium obtained by them from Old Rhine, father of wines; a sanguine, ardent race, with predominating activity of nerves, capable of every upward flight, quickly influenced by love or hate, with admirable mental talents, though these have been and are restrained in their development, in many districts of the land, under long standing clerical dominion and education; with wit quick and sharp as an arrow, with iron-bound zeal for maintaining provincial independence, full of art-creating energy, fond of singing, rich in tradition, hospitable and sociable."

The female reapers from Niederklee, in the district of Wetzlar, in Rhenish Prussia (*pl. 2, figs. 18 and 19*), have on white caps with black ribands, and black bodices; and wear a green jacket fastened with loops of ribands over the bodice. The frocks are brown, the aprons white or blue, the stockings black, the shoes fastened with ribands.

The women of the Aar valley (*figs. 21 and 22*) are distinguished by their white caps, with three sides, inclosed also at the place of their junction with broad lace. Both jackets and gowns have wide sleeves; over the breast is fastened a three-cornered handkerchief, and the hair is rolled up behind.

North Germans are the inhabitants of Waldeck and Schaumburg, Lippe-Detmold, Oldenburg, Bremen, the three Grand Duchies of Anhalt, Brunswick, Hanover, Hamburg, Holstein, Lübeck, Mecklenburg-Schwerin, and Mecklenburg-Strelitz. They are partly of ancient Friesian and ancient Saxon, partly also of Wendish descent. Of Wendish descent, but germanized, we find the inhabitants of Mecklenburg, whose line of princes is still of Slavonic descent, as well as the people living in Lübeck, in Ratzeburg, in Holstein proper, and in Wagrien; of Friesian descent are the inhabitants on the Oldenburg and Hanoverian coasts of the North Sea, those of Ditmarsch, who live in the dikeland between the Elbe and the mouth of the Eyder. Even beyond the Eyder there are people of pure German origin, but the Scandinavians predominate.

In the Duchy of Brunswick the young peasant wears a red waistcoat, mounted with numerous metal buttons in two rows, a dark short jacket or a coat, short breeches, and blue stockings with white clocks. A velvet cap, turned up with fur, covers the head. Old peasants often wear a large hat turned up at the sides and behind, a red waistcoat with one row of buttons, and a white coat lined with red. The peasant girls (*pl. 2, fig. 20*) wear on the hair combed back from the forehead a small black cap with long ribands hanging down behind; a broad black riband, embroidered with silver or set with stones, around the neck; a bodice bordered with riband, over which is placed a large white handkerchief; a light apron over a frock which is dark, but bordered with bright colors; a sash whose two ends hang down over the whole length of the apron; and grey stockings, with black clocks.

In Brunswick-Lüneberg, Wendish traces are still here and there manifested, as well in the names of places as in pronunciation, dress, decoration of the hair, marriage ceremonies, &c. The people are vigorous, temperate, hospitable, and obliging. *Pl. 3, fig. 3*, represents a female peasant of Lüneburg. She has a handkerchief bound around the head and fastened at the throat, and on this is placed a round cushion on which she carries her basket. The frock has tight sleeves, and is fastened tight around the breast, where it is cut out tolerably low. The inhabitants of the four provinces, Kirchwerder, Altengamm, Neuengamm, and Curslac, in the domain of Bergedorf, which is possessed by Hamburg jointly with Lübeck, are called "Vierländer" (Four-Landers). These four lands are a fruitful district on the Elbe, and here the cultivation of vegetables and fruit, as well as of flowers, is practised in a superior manner. Many a farmer sells annually 20,000 to 30,000 pounds of cherries at Hamburg, where strawberries from the same region of the value of 50,000 to 60,000 marks (\$14,300 to \$17,000) are also sold in a year. Cattle breeding is also carried on here, and the Vierland cows are large, handsome, and good milkers. The inhabitants of Vierland, who are distinguished by their peculiar fashion of dress and ceremonies, are probably the descendants of colonists who immigrated in the twelfth century from the Netherlands. *Pl. 3, figs. 4 and 5*, represent a Vierland man and woman. The man has on an ordinary round hat; a red waistcoat, with two rows of

metal buttons; a blue jacket; short black breeches with metal buttons, and black stockings. The Vierland peasant woman is distinguished, in the first place, by a peculiar straw hat, which is turned high up and then bent down again. The hair is plaited into long braids, which hang down. Bows of black riband, with long tips, adorn the neck. A jacket, a short full petticoat, an apron, and black stockings complete the dress.

The Holsteiners are a vigorous, well set, very healthy race, and the peasants support themselves by horse-dealing, cattle breeding, and the extensive cultivation of grain and rape-seed. Holstein butter is celebrated. *Pl. 3, fig. 2*, gives us a picture of a Holstein butter woman, who is especially distinguished by a round hat, about which is bound a broad black riband with bows. The remainder of the attire has in it nothing peculiar.

The East Friesians are a people who love truth and rectitude, and who are loyally attached to their native country. They are straightforward and guileless; serious and discreet; devoted to that which is ancient and mistrustful of innovations, but when the latter have been once tested, they introduce them energetically. They are withal frugal, temperate, chaste, hospitable, but in a measure still very superstitious. The mode of life and disposition certainly differ in different districts, but in the interior the ancient character and manner of life are still the most prevalent. *Fig. 6*, a female peasant of Saterland in East Friesland (in the Grand Duchy of Oldenburg). The people of Saterland are single-minded, good-hearted, friendly men, who are strongly attached to their old customs and usages, to their ancient rights and liberties. The woman here represented is in her Sunday dress, intending to go to church. She has on a white cap, with red ribands upon it; a red jacket and a red petticoat; black sleeves on the fore-arms, besides a fancy-colored handkerchief over the bosom, and a green apron tied around the waist. *Fig. 7* gives the picture of a servant girl from Leer, a Hanoverian town on the Leda, thirteen miles south-east from Emden, and thirty from Oldenburg. Maritime trade is brisk at this place, where there are also considerable linen factories and horse-markets. The servant girl here represented has over the brown or generally dark-colored petticoat, a short garment which reaches only to the knees, with short sleeves, and cut out a little at the top. The hair is worn parted on the crown and tucked up behind. A long green apron is tied around the waist. The fish-women of East Friesland (*fig. 8*) wear red petticoats, black bodices, and no neckerchiefs; a straw hat with red ribands and red trimmings; grey stockings and coarse fisherman's shoes, turned up high in front.

The *Middle Germans* also display many differences among themselves; and their manners, customs, costumes, and language, are merging, at the north and south, into those of the North and South Germans. The two principal portions are the Thuringian Upper Saxon and the Hessian group of territories. The former consists of the Kingdom of Saxony, around which are grouped the Grand Duchy of Saxe-Weimar and the Saxon Duchies, and the Principalities of Schwarzburg and Reuss; and the latter

extends upwards on the Eder, Fulda, and Werra, and downwards on the Lahn, and penetrates like a wedge into Franconia. It includes, however, also the districts of the Westerwald-Taunus (Nassau), the Bavarian Palatinate of the Rhine, Birkenfeld, Nahland, Saarland, and Luxemburg. The political boundary lines, indeed, cut in the midst the natural division lines of the people. On the whole, the Middle Germans inhabit a beautiful, large, and favored territory.

The Saxons received their name only at a late date. Until the tenth century, Slavonic stocks (the Sorben Wendes) inhabited the land of Saxony. Conquered by Henry I., a portion became converted to Christianity, part of them adopting German manners and intermingling with the Germans; others remained unmixed, as we find even now in Saxony, especially in Upper Lusatia, near 50,000 Slavonians (Wendes), who retain their peculiar customs and language. The name Saxony was first given to their possessions upon the Middle Elbe by the Ascanians when, at the fall of Henry the Lion (1180), the great old Saxon duchy was dismembered. From the Ascanians, through Frederick the Warlike, the Margraves of Meissen received the Ascanian electoral dignity, the Ascanian coat of arms, and the name Saxony. "They are," says Duller, "a lively, sociable race, exceedingly capable of improvement, in whom a transition from the corporeal structure of the North to that of the South is perceptible. They possess great industry and aptitude; are careful as to what they do and what they leave undone; upright in their intentions and actions; respecters of the laws; brave in war; conscious of their own powers, without presumption or vanity; of yielding disposition, without weakness; tractable and civil; obliging and agreeable, without being inclined to yield what is due to themselves."

Götzinger remarks with reference to the Upper Saxon dialect: "It prevails in Thuringia and the old Margraviate of Meissen, and has also been spread over Upper Lusatia and Silesia. With very immaterial alterations, it appears to be the same everywhere, great as is the extent of the country throughout which it is spoken, and presents, at all events, fewer variations and changes than the Franconian. Only in the modulation of the voice, and the high and deep utterance of the vowels, do the Thuringians, the people of Meissen, the Lusatians, and the Silesians differ from each other; the relation of sounds and grammatical structure are essentially alike everywhere." Whether, however, an original Thuringian dialect forms the basis of this Upper Saxon, or whether the entire idiom has arisen from an intimate union of the Franconian with the Lower Saxon, Götzinger leaves undecided; he thinks, however, that Thuringia, at all events, appears to be the native place of this dialect, since German stocks always lived here; whilst, on the other hand, Meissen was wrested from the Slavonians, and peopled with Thuringians and Saxons. Götzinger designates the Upper Saxon dialect, moreover, as an intermediate one between the high and low German; the skeleton being high German, the idiom and construction a low German dialect. The Saxons are attached with extraordinary fervor to the land of their birth, and are less inclined to

emigrate than the people in South Germany. The mountaineers, who, for the most part, are poorer than the inhabitants of the fertile plains, are more good-natured and more complaisant, but more sensual also, than the farming peasantry of the low lands. The popular festivals most generally kept are the anniversaries of church consecrations (church-ale) and target shooting, which is carried on, on a grand scale.

The Wendes are less refined, but industrious and temperate, frugal and hospitable. They are a vigorous kind of men, and their language is melodious and energetic. In their manners and customs they have many peculiarities. At the birth of a child, the midwife goes out to invite the sponsors. In case the child is a boy, she holds in her hands a small black rod; if a girl, a white one, or else merely a white cloth. After the christening of the child, she takes it back to its parents, bringing at the same time the presents of the sponsors, to which, when it is a boy, are added nine kinds of seeds; when a girl, a sewing needle and a few grains of flax-seed. When giving invitations to a wedding, the bridegroom and the inviters (*Hochzeitbitter*) appear in black attire, upon black horses adorned with variegated ribands: it is only in case the bridegroom is poor that they appear on foot. On the wedding day the bride wears a black coat lined with fur, a black velvet cone-shaped cap, upon which is placed a broad brass ring studded with stars, and a green or red silk crown. The two plaits of hair, which hang down below the bridal cap, are bound around with a green silk riband. Strings of coral, and gold or silver chains with old coins, decorate the neck. When the procession proceeds to church, the bride is attended by a troop of bridesmaids dressed like herself, and the bride-mother or *Salzmäste* (literally salt box), which latter personage, upon the return, throws out cakes and small pieces of money. Musicians marching in front play the bridal march. Among rich Wends many, among poor ones few dishes are customary, and after every course the guest cleans his wooden platter with a piece of bread. The bride holds the slice of bread first cut off, and preserves it carefully, as hidden virtues are ascribed to it. After the eating comes dancing. At the home-bringing of the bride to her future dwelling, she sits upon a wagon packed with her entire effects, and gives, as a present, to the first person who meets her in the yard of her new residence, a loaf of bread, and to the others beer out of a milk vessel.

The Prussian Province of Saxony comprehends very different stocks of people. It consists of that portion which formerly belonged to the Kingdom of Saxony, and which at the Congress of Vienna fell to the share of Prussia, and of the Altmark fused into the governmental district Magdeburg. Ancient and modern Saxon and Thuringian, as well as ancient German and Slavonic manners, are here combined.

The Thuringian stock is a peculiar one, and inhabits the Province of Saxony, the Grand Duchy Saxe-Weimar, the Duchies Saxe-Meiningen-Hildburghausen and Saxe-Coburg-Gotha; also Schwarzburg-Rudolstadt, Sondershausen, and Electoral Hesse. The Thuringian possesses a true German character; he is faithful and honest; makes use of but few words,

but his word once given is sacred. His inextinguishable love of home is still stronger than his genuine German migratory inclinations ; he respects and exercises hospitality ; is industrious, and manifests at the same time lively enjoyment of life, good sense, and ability. In the eastern part of the Thüringer-Wald, old persons still wear leather breeches, long dark-colored coats, with large polished or mohair covered buttons, shoes with buckles, and a large triangular hat ; whilst the village youths, throughout almost the whole of Thuringia, wear a species of plain national dress, boots, long pantaloons of cloth or summer stuff, a green or brown jacket, and a light cloth cap ; in Franconia the fur cap also. A prominent part of the female dress is an expensive cap, made of velvet or silk, with genuine gold and silver embroidery, and an abundance of bows of riband. The Franconian females wear a large straw hat in the form of a great hood, which for girls is mostly trimmed with green riband and rosettes, for women and for persons in mourning with black riband. A handkerchief wound round the head in the manner of a turban, the broad points of which fall down on the nape of the neck, is also often worn instead of the hood. The bodice of girls is mostly fancy colored, that of women dark colored ; the full heavy frock of cloth or some other woollen fabric is green, with light green trimming. In Gotha countrymen wear a coat woven of wool and flax (linsey-woolsey), or an ordinary peasant's coat of cloth. Under this they have a fancy colored waistcoat, and yellow leather breeches. Over it, when about to attend to business out of the house, the peasant throws a white or blue linen frock, shaped like a shirt. Grey cloth or white linen gaiters cover the legs. The women generally wear dark green or dark blue cloth, frieze or linsey-woolsey petticoats, trimmed with light blue and green ribands ; out of doors, a yellow straw hat and black cloak. The bridal dress consists of a red head-dress of riband, lying evenly around the bound up hair, upon which is placed the wreath, a black bodice, long very full petticoat, and a black jacket with wide sleeves, and trimmed with strips of yellow velvet. From the left to the right side depends a belt of linked plates of silver with a gilt clasp ; at the place where it hangs lowest, a key and handkerchief are fastened. Blue velvet muffs or gloves, tipped with marten's fur, cover the hands.

The female peasants represented in *pl. 3, fig. 1*, in Sunday dress are from the neighborhood of Erfurt. They wear the above mentioned caps of black color trimmed with ribands ; variegated kerchiefs, plain, colored, or figured long sleeved jackets, with a large turned over collar ; under the latter a tucker ; and besides these articles, a frock and apron with or without trimming.

Thuringia abounds in popular festivals, and also in peculiar local gatherings, of which fairs, shooting targets, and church-ale are the principal ones. The Thuringians are fond of dancing also, and their favorite, true national dance is a kind of figured waltz. Their simple, generally melancholy, and love-breathing popular ballads are ever sung by the musical sons and daughters of Thuringia.

The peasants in the *Duchy of Saxe Altenburg* are a species of people

altogether peculiar. They are of Sorben Wendish descent, but by this time, however, have become fully germanized. *Pl. 2, figs. 23 and 24*, give us a representation of the costumes of a male and female peasant of Altenburg. It is very original, and even children wear it from the time they are three years of age. The hair is cut short, and round; and upon the head, as an esteemed ornament, sits a quite low, narrow brimmed, black felt hat. The shirt is furnished with a collar resembling a border, embroidered with small figures of white linen thread. The name of the owner is wrought in black silk, and the shirt is fastened with a black riband, and a buckle, which is often valuable. Over the shirt is worn a broad black vest, which is edged at the neck with red cloth; and over this are worn suspenders of black varnished leather, neatly stitched with green silk, and held together in the middle by a cross-piece. Wide black buckskin breeches, fastened at the knee, form a part of the best dress, especially when the wearer, on holidays or at weddings, and in warm weather, throws off his upper garment, and goes in his fine, very wide, finely plaited, snow-white shirt sleeves. Over this under-dress, the peasant wears his principal garment, the cape, of black cloth, lined with green flannel, with three neat plaits upon the back, reaching from the short waist to the calf of the leg, and fastened in front with hooks and loops, or with buttons. Boots are worn on the feet, laced shoes less frequently, and then generally in summer. When the more aged peasant goes to town he carries his basket on his back, and has an iron stick. In summer the peasant has another cape of very white cloth, tight, without seam, with small plaits on the shoulder, wide sleeves growing narrower towards the hand, trimmed at the end with black leather, and adorned with velvet cuffs, which reach nearly to the elbows. From the neck, down in front, the white cape is lined with blue striped ticking, or some other linen fabric of a similar nature, sometimes also with English calico, with a narrow border of leather or velvet. Shoes are worn with the white cape. The peasants, at present, also frequently wear a cloth spencer, mostly of a green color, which is always kept buttoned up, and in winter trimmed with fur or plush. In winter, and in rainy weather, a large cloak, generally made of green or dark blue cloth, or a species of blanket coat, is also worn. Besides these, the peasant often wears in winter a coat of handsome white fur on the outside, and a black fur cap, upon which the small hat is squeezed. Girls wear their hair in two plaited bands, which are twisted in the form of a circle around the centre of the head, and above this is the "nest," which consists of a band of pasteboard about two inches broad, sewed together at the ends, covered with calico, or other stuff, beset with enamel or spangles, and encompassed by a rim of pasteboard or paper. It is held fast by an iron or brass needle (*Senknäle*), broad at both ends. Underneath and around the nest is worn a black riband binding, which ends on the forehead in a point, and at the place where the ends of the pasteboard are fastened in a neat bow. The throat and back of the neck are covered with a collar and ribands. At present, the girls frequently wear a variegated handkerchief over their braids in winter, from the knots of which the two long

ends proceed like wings. Various ornamented figured sleeves are worn over the chemise. The two ribands hanging down from the collar attached to the sleeves, are tied under the chin in a bow. Then comes the bodice. In front of this is the great pasteboard stomacher covered with stuff of some sort. This covers the entire chest, is flat as a board, and stands out so far that nose and mouth may be nearly concealed underneath it. On Sundays or holidays, as well as in cold weather, a jacket is put on over the latter. The petticoat, which often reaches only to the calf of the leg, is of calico, half silk, or woollen material, and is made with many gathers tightly sewed together. Above this is an apron. For mourning, as well as in old age, the dress is black. To the short petticoat belong very white stockings, often embroidered and open-worked, with handsome figured garters. The shoes and slippers, also, are frequently beautifully ornamented. Women defend themselves against the weather by means of a large calico cloak, or a cloth, or silk upper garment. Maidens, at weddings, or when acting as godmothers, are distinguished by the "Hormt," a headdress in the form of a round bandbox without bottom, covered within and without with red damask or velvet, and secured by ribands under the chin. Around the Hormt are disposed thirteen silver plates or tablets, and upon every one of them stand three rows of raised silver buttons. Silver plates, heavily gilded, hang round about it on rings; and behind, on the Hormt, are two tresses of tow, which, bound around with red or green velvet riband, and arched in a half circle above it, are adjusted at the forehead. Between these tresses is a coronet of silver tinsel, set off, if the girl is a bride, with green silk, if she stands as a godmother, with red silk, and made still more gaudy by the addition of gilt beads. Behind, where the two tresses meet, there is a red silk riband bow, and another underneath it, to which are attached long, flowing, fancy colored ribands. These tresses, when forming a part of a bridal dress, are green, at other times red. A Hormt costs from 40 to 100 thalers (\$30 to \$75), and on this account passes in the family by inheritance, or it is often lent also for particular occasions merely. The weddings of the rich are celebrated with great expenditure of money; and great processions, on foot, or on horseback, or in wagons, accompany the groom when he goes to fetch the bride. At such times the guests meet at the house of the groom, and after they have been entertained with cakes, beer, and whiskey, move in couples on foot and with music, to the house of the bride. If she, however, is in another village, they ride on horseback often to the number of fifty or sixty men, followed by forty or fifty women in wagons. The musicians at the head, on horseback, or in wagons, play cheerful airs; then comes the inviter to the wedding, who leads the nearest relations of the groom; next follows the groom himself, with his two groomsmen (who are brothers or near relations of his), and finally the guests above referred to. All the horses are provided with white, yellow, red, and black harness, adorned with ribands; the tail having, moreover, twigs of box tree, or a nosegay of flowers, attached to it. Maidens, adorned with the Hormt, accompany the bride. Our space will not permit us to describe the wedding festival itself.

In the house of an Altenburg peasant great neatness and order usually prevail. In the sitting-room we find for the most part tables, benches, and chairs, which are scoured to whiteness, and a rich, neatly-decked kitchen rack. The copper boilers placed in the tiled stove are highly polished. There are no true popular festivals in this part of the country; besides the three high holidays, church-ales, betrothals, weddings, movings of new married people, and christening festivals, only small family parties, cherry-gatherings, harvest-homes, &c., are held in taverns. There is much dancing indeed at these festivals, but the peculiar national dances have gone out of fashion. Card playing is a favorite amusement, and high play, we are sorry to say, often occurs. Altenburg peasants know how to live well, and, especially when they pay a visit to town, spend a great deal of money. The country people of Altenburg are divided into three classes. At the head, as the most opulent, stand the large farmers, and farmers on a smaller scale but who still keep houses. The second class are farmers who cultivate rented land, gardeners, and cattle-breeders; and the third class are cottagers who neither own nor rent land, but have the use of a cottage and a plot of ground on the farm of a first class peasant, paying an equivalent in the shape of labor.

The Silesian. In very ancient times Silesia became inhabited by the Lygines and Quadi, who in the sixth century were dispossessed by the Slavonians, in consequence of which the country afterwards fell to the Poles. The name Silesia, is derived from the Slavonic word "*zle*," which is the Polish translation of the word *quad* (bad). Under the Polish rule Christianity, and also the Polish language and customs, were introduced. The present inhabitants are partly Germans, partly Slavonians of the Polish stock; in Lusatia, however, also Wendes. The Slavonians on the right side of the Oder are more fully germanized, those living on the confines of Poland and in Upper Silesia the least so. Here, as everywhere, the Germans are distinguished above the Slavonians by industry and greater civilization. To proceed: Silesia consists of the Duchy of Silesia, the County of Glatz, the Prussian portion of Upper Lusatia, and an unimportant part of New Mark. The Duchy of Silesia is usually divided, in ordinary acceptation, into Upper and Lower Silesia. Lower Silesia extends from Brieg, upon both sides of the Oder, as far down as the borders of Brandenburg; Upper Silesia, on the other hand, forms the south-eastern part of Silesia, on the confines of Moravia. The principalities of Troppau, Jägerndorf, and Neisse, and some other small principalities of Upper Silesia, belong to Austria. The inhabitants of the Riesengebirge (Giant Mountains) are strong, slender, and hale; temperate, industrious; pure in morals, benevolent, and religious, but credulous and superstitious also. The rural population still attach credit to the legend of Number Nip. The dress of the men is a blue, green, or grey cloth coat, reaching to the thigh or to the knee; a cloth waistcoat, short black or yellow breeches, grey or white woollen stockings, and a triangular felt hat. To these are added shoes with nails; and in snow, snow hoops; on glazed frost, ice-spurs. The snow hoops are mostly made of tough

pine twigs. They are about ten inches in diameter, and are interwoven on the inside with cord. One of these hoops is laid flat under each foot, and fastened to it with strings, by means of which the sole obtains a greater surface and cannot easily sink in the deep snow. When the people cross the mountains they make use for support of a smooth pine stick about five Bohemian feet long and an inch and a half thick. The women wear a cloth bodice, with a large flat stiff stomacher; a short-sleeved chemise, fastened at the throat with a pin; around the neck and bosom a handkerchief of printed linen; a grey or gay colored woollen petticoat which reaches to the heels; and an under-jacket mostly of black stuff, woollen stockings, and shoes. Unmarried women wear the head bare, and the hair twisted in braids, which are wound into a nest around the crown of the head; married women wear caps of white or figured linen, and both classes when at work tie a handkerchief around the head. The mountaineer builds his house, very judiciously, upon the grassy declivity of the mountain. The architecture and size of the house are very much the same throughout the Riesengebirge, and "baude" (booth) is the universal name of these houses. Except a stone-walled terrace which forms the foundation, all the rest, for the sake of greater warmth, is built of wood. Boards closely joined together form the walls, the seams of which are stuffed with moss, and sometimes plastered over with loam. In-doors the walls are lined with boards, partly for the sake of greater cleanliness, but more for warmth, and the floor is planked; the outside, on the west and north sides of the house, is covered with shingles. The sitting-room occupies the smaller half of the house, and in it, even in summer, the fire is kept burning in the large brick stove. Before it are the entrance hall and kitchen, with the dairy adjoining. From the hall there is an entrance into the stable, which, however, has another entrance at the front of the house, through which the cattle are driven in and out. The inhabitants of Upper Silesia are also a vigorous race of men. *Pl. 3, figs. 9 and 10*, represent male and female peasants from the neighborhood of Krappitz. The man wears a fur cap; a short coat with large flaps, and one row of buttons; a white shirt with a turnover collar; a fancy colored handkerchief tied around the neck; short breeches and long boots; and a long coat over the whole dress. The woman wears a cap with a fur border; a jacket with a large collar and long skirt; a tolerably long petticoat bordered with riband; a broad gathered apron; a red handkerchief; and around the neck a scoloped collar. The stockings are scarlet colored, and the shoes have bows of bright colored riband.

The Bohemians belong to two different stocks, the Slavonic and the German. The Bohemian Slavonians, who constitute the fourth part of the entire population, calling themselves Czeches (Tchekes), belong to the north-western (Lechish) stock of the Slavonians, and their language, of all dialects, first became cultivated. The German Bohemians inhabit mostly the country bordering on Bavaria, Saxony, and Prussia, and their language is now that of the educated people of the country. The Czeches inhabiting Bohemia are not everywhere alike. In the north-east we find a

tall stature and well shaped countenances, which is not the case in the south-west. The Bohemians, everywhere, are muscular and strong, but not obese. The German Bohemians are somewhat taller, especially those who live near the river Eger, who are a hardy, powerful race. True national dress is seldom found in Bohemia; the ordinary German style prevails almost everywhere. The Slavonic inhabitants wear a round cut coat, with a single row of buttons, a very low collar, and many gathers at the pockets; a vest with pockets and one row of metal buttons; short breeches; woollen stockings; a low round hat with a broad brim, or, instead of the latter, sometimes the old fashioned high Slavonic fur cap. The hair, in south-western Bohemia, is worn long and combed behind the ears; in the north-east, however, it is cut in different ways. The girls and women wear a high, stiff, and tub-shaped bodice, reaching to the nape and chin; very full skirts, often eight or ten, one over the other; red woollen stockings with white clocks; shoes with buckles, or sandal slippers; a silk or cotton apron, and a corset with a round falling collar. The hair is worn in braids, through which silver or brass pins are stuck; above these is placed a round low cap, with a very large riband bow behind. Instead of the cap, girls wear a bandeau, the broad stiff ends of which stand out on both sides like wings. Around the neck they wear strings of pearls, or else ribands, on which hang gold and silver coins. South of Prague wooden shoes begin to be common. The German inhabitants are easily recognised by the dark blue coat and the bright red waistcoat, mounted with polished buttons. The triangular hat, with the flap turned down in front, with them takes the place of the small round hat of the Czeches. The peasant of the districts near the Eger remains true to his ancient style of costume and black color of dress, on account of which an affinity between him and the inhabitants of Altenburg may be presumed. In the circle of Pilsen, particularly in the principality of Chotieschau, the women (*pl. 3, fig. 23*) wear lace caps, with broad round sides, and a rosette of riband on the side, and which are tied with a broad blue riband. The waist is very short; the blue skirt, trimmed with variegated ribands, reaches to the knee. Under this frock, however, there are other petticoats, worn in such a manner as to cause a great projection behind. On the bosom is worn a white chemisette, and over this a red handkerchief bound cross-wise. The remainder of the dress consists of a short spencer, turned up with red, and provided with short skirts, having many gathers, and standing off from the body. Around the waist are bound a chequered apron, and a girdle embroidered with gold and silver. The stockings are scarlet, and the black leather shoes have large green riband bows. Their baskets are also trimmed with a number of light colored ribands. Girls wear long plaits, and a blue riband, in the manner of a diadem, around the bare head; and at the back of the head long, pendent, variegated ribands.

The male dress consists of a broad brimmed round hat, with a broad band, buckle, and lace upon it; a figured waistcoat and long coat, both of them bordered with red, and furnished with large button-holes embroidered with green, and a great number of buttons standing close to one another

(forty on the coat alone). The coat is lined with white. Yellow leather breeches and black top boots cover the legs. The German dialect in the circle of Pilsen is not very different from the Franconian, and appears to be a transition from the latter to the Saxon. In the vicinity of Bunzlau, the male dress consists of a hat with broad brim, black leather breeches, and a short dark blue coat. The women wear a round cap, with a small lace border, lying smooth on the forehead and cheeks; girls, however, wear braids, which are wound together upon the crown of the head in a nest, which is held by a pin, and over this is a handkerchief. The remaining attire consists of a high stomacher; fancy colored ribands worn on the shoulders; a short full skirt; red stockings, and shoes with high heels. The German inhabitants of the central Böhmer-Wald are of middling size, fair-haired, and of muscular form; sometimes rough in manner; and having a great predilection and considerable talent for music and singing. They are industrious and pious in their family circles, friendly and complaisant towards their neighbors. In them, also, the love of travelling is united in a peculiar manner with the love of home. The male dress consists of short black leather breeches, trimmed at the seams with white lace; white stockings with shoes, or blue stockings with half boots, which fall down in folds below the middle of the calf; a crimson, blue, or green silk waistcoat, flowered with gold and adorned with polished buttons; a loose violet blue or black velveteen jacket, reaching to the hips; and finally, a cloth coat, extending to the ankles, with a narrow, simple, stiff-standing collar. A crimson handkerchief is tied around the neck; and from the pocket, on the right side of the breeches, projects a silver-mounted case, containing a knife, fork, and spoon. The women tie up the head in a check handkerchief which entirely conceals the hair, except at the temples, where a little of it is seen. Their stuff jacket does not reach entirely to the hips, is much cut out at the bosom, where it is broadly trimmed, and permits the chemise, which reaches almost to the throat, to appear. Under the jacket girls wear a bodice, which is black or red, and trimmed with a gold border. The petticoat formerly consisted of strong red linen stuff, and reached scarcely to the calf of the leg; at present it is longer, and composed of various materials. The stockings are most frequently white.

The Austrian, in general, evinces more cheerfulness and genuine good-nature than earnest depth of soul: he is honest, upright, hospitable, charitable, and intelligent. In the revolutionary movement of the year 1848, the truth of the following remarks of Duller with reference to the Austrians, was plainly shown. "Happy, thoughtless, excessively fond of pleasure, as is the Austrian, especially the Viennese, we must not nevertheless believe that his love of show and enjoyment of every description impairs the clearness of his views and his convictions. A strong sense of right especially supports him, much as he has become accustomed to endure; and in the cities, particularly in Vienna, under the external appearance of frivolity, the mind is agitated, imperiously claiming participation in the promotion of the interests of the German people. Powerful as this instinct is in the very heart of all the educated classes, their patriotism one of the most beautiful

and honorable characteristic traits of the Austrian, is no less ardent. It is not only the soil that he loves, it is the sacred idea of the Fatherland, for the sake of which he joyfully meets every danger."

The inhabitants of Upper and Lower Austria are not only distinguished by the different dialects spoken by them, and which our space forbids us to characterize in this place, but also by their different manners and costumes. There is even a marked difference among the Lower Austrians themselves, inhabiting different districts, observable not only in dress and habits, but even in bodily form, strength, and beauty. In the central part of the country, the dress is very much the same everywhere, and not very becoming. It consists of handkerchiefs (among the rich, of black silk) tied around the head, with two long ends covering the neck; short jackets with short waists and broad shoulder-pieces, variegated handkerchiefs around the neck and bosom, long petticoats, and aprons. The men, especially the artisans in small towns, wear cloth caps, or old-fashioned felt hats, coats of medium length, and short or long breeches. In the vicinity of the mountains and in the mountains themselves, however, the peculiarities of the mountaineers, or inhabitants of the neighboring Alps, may be observed; in the same way the vicinity of towns is found to influence the dress of country people.

The Upper Austrians are a very susceptible people and full of humor, as well as industrious, benevolent, and honest; in them cordiality is united with prudence and activity. They understand the mode of cultivating their beautiful country better than the Lower Austrians, and are more advanced in husbandry generally than the latter. They are withal a handsome, healthy race; the beauty of the women of Upper Austria, especially in the vicinity of Linz, has even become proverbial.

The people of Salzburg are able-bodied, courageous, and of a poetical temperament. *Pl. 3, fig. 19*, represents a Salzburg woman, with the becoming cap, rich in gold. The females of Linz and other Austrian women wear a similar cap, which, however, is going out of fashion. The peasant of Pongau in Salzburg (*fig. 16*) wears a broad girdle around the waist; green suspenders, with a cross-band; a waistcoat with two rows of buttons; short black breeches; white or grey stockings; shoes; and a brown coat, bordered in front with green, without lappels, and with a short collar. The hat is the usual round one. *Fig. 17* represents an Upper Austrian peasant from Lake St. Gilgen, with round hat; short red waistcoat, trimmed with gold lace; short ordinary blue jacket with metal buttons; short black breeches, with broad waistband, trimmed with lace, and either tied or buttoned at the knee; white stockings, and half boots laced in front. The country girls on Lake Fuschl, in Upper Austria (*fig. 18*), wear a round, somewhat broad-brimmed hat, a low stomacher and breast-piece, a long colored frock, and a blue or fancy colored apron. Around the neck they wear a broad pearl necklace, with a large locket.

The Styrians belong to two entirely different stocks, the German and the Slavonic; the former inhabiting the northern, the latter (the Wendes) the southern part of Styria. The Germans speak the rough and harsh

dialect of South Germany, rich in obsolete words and provincialisms, but approaching in sound to the true Austrian dialect. The whining, sing-song enunciation of the people of Middle Styria is endurable only through habit. The Upper Styrian has a more solid, stronger body, and better established health than the Lower Styrian, who, owing to the mildness of the climate, and his less burdensome work, is taller and thinner, but less enduring. The Upper Styrian still retains the ancient German probity in a high degree, and it is but seldom accompanied by rudeness. In the mountainous tracts, his harmless, gay taste is displayed in a great love of singing and dancing, and in the characters of his national songs. The tunes of the dancing music, produced on a kind of cymbal (dulcimer), which is never wanting upon such occasions, and but two violins and a violoncello in addition, are mostly taken from popular airs. Notwithstanding the expressiveness of the national Styrian dance in itself, owing to its twisting, turning, entwining, releasing, withdrawing, recovering, and gentle balancing, the dancers are not satisfied with such a pantomime of jovial frolicsomeness and hearty good will, but will often intermingle detached verses of songs, and jumping up will clap their hands, sing a snatch from a *yodling* song (characteristic, undulating melody of the mountaineers), or utter a piercing whistling, the embodiment of the highest glee. The Upper Styrian, withal, is pious even to bigotry and superstition, but also compassionate and charitable. The peasant is insolently proud of his rank in life, free from servility to his superiors, and hates nothing more than partiality. Serenading is customary in Styria, and the low tones of the jew's-harp attract the chosen maiden to the window. Besides singing and dancing, the Upper Styrian is passionately fond of shooting at a mark and hunting. The dress of the Styrians varies greatly; the German inhabitants dress chiefly in the German style; the Wendes adopt partly the German, more frequently the Croatian dress. The costume of the Upper Styrian consists of a dark green, or brown, or grey coat, turned up with green, green suspenders with or without breast straps, black leather breeches, a broad leathern belt, tie shoes, and large, black, often tapering, and high hats. He adorns his hat with feathers of the mountain cock or heath-cock, and the beard of the chamois. Instead of a coat he sometimes wears a brown or grey jacket turned up with green (*pl. 3, fig. 20*); the hat is sometimes of green felt, and not tapering, but on the contrary becoming larger towards the top, and having a broad green riband and a large buckle. The women (*figs. 21 and 22*) wear full skirted woollen petticoats of green, brown, or black colors, a variegated stomacher, a colored bodice, short corsets of printed linen or calico, blue linen aprons, red or green woollen stockings. On the head they wear hats of felt or of black stuff with a broad plaited brim, or a black cap, either conical or round, and plaited, bound with gold lace.

The Illyrians. The northern portion of the kingdom of Illyria consists of the Duchies of Carniola and Carinthia; the maritime country constituting the southern section. Most of the inhabitants are of Slavonic descent, the Germans, Italians, &c., residing here being much inferior in

number to the former. The Slavonians living in Carinthia, as well as the people of Gailthal, Rosenthal, and Faunthal, are Wendes. The Germans in Carinthia are of Franco-Boiish descent. Carniola is inhabited almost entirely by Wendes, who are usually called Carniolans; and in the midst of them are a people of true German origin, the Gottscheers. Slavonians, together with Karsti, Istriani, Liburnii, Furlani, and some others, constitute the inhabitants of the greater part of the Illyrian maritime country. The Slavonic inhabitants are in general well formed, hale, and long lived. The German Carinthians, as respects externals, bear great resemblance to the Styrians. They are a kind, upright, active, industrious people. The Wendes of Carinthia are less industrious than the Germans of the same country, and, excepting the people of Gailthal, less cleanly. The Carniolans are honest, upright, industrious, and gay, but at the same time choleric and superstitious. The Gottscheer is considered a good-natured, frugal, loyal, pious man. The character of the inhabitant of the Illyrian maritime country is partly the Slavonic, as in Carniola, and partly passes into the Italian. The national costume of the Carinthian resembles in general that of the Styrian. The peasant wears a short woollen coat with a nap on the inside, which, in winter, is exchanged for a furred smock-frock; a coarse woollen or leather jerkin, with one row of buttons in the middle; a black handkerchief tied around the neck; short leather breeches, in the side-pockets of which, according to the custom of the mountains, a knife and fork are placed; white stockings; and tie shoes, which are fastened to the feet with thongs. The female peasant wears a short petticoat; shoes fastened with ribands; a hood that lies smoothly upon the head, and which is ornamented all round with riband, or instead of this a fur cap. On the top of these she places a very large round hat. The German Carniolan generally wears a red jacket, a dark brown cloth coat, short black breeches, and blue stockings. When upon a journey, the Lower Carniolan carries the "torba" (a small pouch); the Upper Carniolan, under similar circumstances, throws the "bassaga" (wallet) over his shoulder. A black silk hood, trimmed with white lace, a very full, black over-gown, and red woollen stockings, constitute the usual attire of females of Carniola. The Gottscheer of the same country (*pl.* 3, *fig.* 24) belongs to an industrious race of traders, who, at home, manufacture linen, wooden ware, sieves, &c., in large quantities, and take these things, or southern fruits, olive oil, rosoglio, iron ware, and other articles, to the fairs all over Europe. The Gottscheer wears a broad-brimmed, round, low, felt hat; neck and breast generally remain bare. He also wears a shirt with a broad collar that can be turned over the coat, wide coarse cloth pantaloons, or long leather breeches trimmed with riband. With the latter article, low shoes with numerous leather thongs, or short boots, are worn. A short jerkin, or a short whitish-grey or brown cloth habit, without gathers and pockets, a broad leather girdle around the waist, and (in winter) also a whitish-grey coarse cloth cloak, complete the dress. Women wear a large white blanket around them, fastened in front under the chin. Their hair is cut short; the girls only wear plaits. A long chemise, with ruffled wristbands and

broadly plaited collar, linen petticoat and apron, a wide, coarse cloth frock, without sleeves, over the articles first mentioned, and a blue or black woollen belt around the waist, constitute the attire of these women.

The Tyrolese are divided into the German in the north and the Italian in the south. The German Tyrolese are handsome, often rather lank, but at the same time muscular. They have small eyes, open countenances, high and broad shoulders; are hale, vigorous, and active, to an advanced age. Many a Tyrolese mountaineer might serve as a model of manly beauty; the women, on the contrary, are but seldom very beautiful. Those of the district of Innsbruck, however, are often noticed for an attractive physiognomy, oval face, sometimes dark, sometimes light hair, and handsome brown eyes, and always for their fair skin. In other districts, on the other hand, the women have such colossal figures, that they form the greatest contrast with those of Innsbruck. The dialects of Tyrol differ, but may be ranked in three principal groups: that of Bregenz, that of the valley of the Lower Inn, and that of the valley of the Zill. The first is of Allemannic derivation, and still has many ancient German forms of speech; the second is the softest, is easy and careless; the third, on the contrary, is energetic and harsh, with strong accentuation of the guttural sounds. The two last ones are made up of Bavarian roots. The dress of the Tyrolese is picturesque, but different in every valley. The Passeyrian (*pl.* 3, *figs.* 12 and 13, man and woman) has his brown jacket bordered with red and green; his suspenders are brown, and his green hat is bordered with yellow. Short black breeches, a violet breast-piece under the suspenders, a broad black leather belt around the waist, white stockings, which only extend from the foot to the upper end of the calf, leaving a bare space below the knee, and shoes trimmed with red ribands, constitute the remainder of his dress. The women, on the contrary, are unbecomingly dressed, as the large thick quilted cap, open jacket with short sleeves ruffled at the wrists, the wide, long, full petticoat, wide apron, and the waist (anything but diminutive), give them a very awkward appearance. The woman of Bregenz (*fig.* 11) wears a similar cap, somewhat more conical, a long, black, full petticoat, which is cut out angularly at the breast and trimmed with a border. A piece of gold embroidery, or a white chemisette, is displayed above this. The gown reaches to the ankles. After those of the Zill valley, the women of Bregenz are esteemed the handsomest. The inhabitant of the Zill valley (*figs.* 14 and 15) wears a large tapering hat, adorned with the beard of the chamois, flowers, and cock feathers; a red breast-piece, bordered with yellow or gold; a coarse brown woollen jacket; short breeches; a black leather girdle, embroidered with peacocks' quills (the name of the owner being inserted in the middle of it); white stockings, and black shoes of the ordinary kind. A black handkerchief is tied around the neck. The women wear green, or, more commonly, black hats, of the same kind; the remainder of their dress does not differ, at present, in style from that usually worn in Germany. The peasants of Botzen wear long brown coats; those of Pusterthal, short breeches and jackets, dark vests, black leather belts, white or blue stockings; those of the valley of the Upper Inn, short black breeches,

scarlet waistcoats, over which green suspenders are worn, jackets of various colors, green or blue stockings, and broad-brimmed black or green hats, with riband.

The uprightness of the Tyrolese is well known. They are a very religious people; industrious and frugal, ingenious, courageous, and high-minded; they combine with the love of their native land a great propensity to travel; are always of a cheerful and gay disposition; and, like the Styrians, are fond of singing, yodeln, whistling, music, and dancing.

The Swiss (with the exception of the inhabitants of the canton Tessin, who are of Italian descent, and those of the canton Geneva, and the people living on the confines of France, who are of French lineage) are likewise of German origin. At the fall of the Roman Empire of the West, the Alemanni, Burgundians, and Ostrogoths took possession of the almost depopulated country, permitting the aborigines, the Helvetians, to retain their customs and laws. By this means the different stocks became intermixed, and the German stock remained at last predominant. The Swiss appear to be, in general, an excellent people; they are vigorous in body and energetic in character. The women are generally very pretty, and sometimes even of exquisite beauty, a remark which applies particularly to those living in the Hasli valley in the highlands of Berne, as they exhibit softer features and more delicate figures than the women of other cantons. The Swiss are a truthful and honest people, who steadfastly retain their original character, and are immovably attached to their native land, and to the customs of their forefathers, from whom they have inherited the most ardent love of liberty. In some cantons, manufactures and commerce, facilitated by excellent highways, are in a most flourishing condition. Cattle breeding and alpine husbandry form, however, the principal pursuits of the people. The cantons Lucerne, Schwytz, Uri, Unterwalden, Zug, Freiburg, Solothurn, Tessin, and Valais are Roman Catholic; Zurich, Berne, Basle, Schaffhausen, Geneva, and Neuchâtel, are Calvinistic; Grisons, St. Gall, Appenzell, Glarus, Thurgau, Aargau, and Vaud, profess different creeds. The Roman Catholics constitute about three eighths of the inhabitants. The male dress varies less than that of the female sex, the latter being different in almost every canton.

After the foregoing considerations of these different German nations, or at least nations speaking the German language, we proceed to view them in general, with reference to their mental and bodily condition. Notwithstanding the climate, formerly so inclement, has become mild by the clearing of the forests, and in spite of the introduction of foreign customs and vices, by which the descendants of the ancient Germans have been, in a measure, effeminated, very vigorous forms are still found, especially amongst the mountaineers; and fidelity, honesty, candor, frugality, and industry, are the predominant virtues of the German people. Their correct judgment, their perseverance in scientific pursuits, and their knowledge obtained by these means, are productive of excellent results; even if, in consequence of the depth of their researches into the arts and sciences, and their deliberateness, the fruit of their labor is of slower growth than is the case with other

nations. It was Germany, principally, that formed the most eminent philosophers; and in no part of the world is so great care bestowed upon a thorough education as in Germany, although it yields the palm to the United States with regard to the general instruction of the masses, due to the public free schools of the latter country.

The fine arts and the sciences, commerce, and the industrial arts, have always flourished among the German nations of modern times; and the great prosperity of Germany affords, plainly enough, the best evidence of their mental and physical activity. In spite of the less favorable geographical situation, in spite of the wars and revolutions which have raged among them, in spite of the internal divisions of their country, they stand, intellectually and physically, on a level with the people of the most favored country. When, moreover, the youth continue as they have already commenced, acquiring activity, strength, and health, by means of systematic bodily exercises, the German may easily invigorate not only the body, but the mind, to a degree never before attained. The experience of organized gymnasia shows that the mind becomes fresher and stronger by the practice of gymnastic exercises, which have been, therefore, wisely adopted as a part of scholastic training.

Gymnastics, according to the best authors upon this subject, is the art of taking bodily exercise according to certain rules, as was formerly done in the gymnasia of the ancient Greeks, and hence the derivation of the name. The usual gymnastic exercises are: (*a*) lifting, carrying, and drawing; (*b*) walking with grace and ease; (*c*) running, with a view to rapidity and steadiness; (*d*) jumping upwards, horizontally, and downwards, with or without a leaping pole; (*e*) wrestling, with the view of throwing the adversary on the floor, or of snatching something from his hands; (*f*) throwing with stones, aloft, to a distance, or at a mark, with or without the sling, and hurling the javelin; (*g*) climbing up a pendant rope, or a pole, trees, &c.; (*h*) balancing (the art of equilibration) of the body, in standing upon one leg, or standing or walking upon a beam, or a rope, in running on stilts, and in skating; (*i*) dancing, riding, swimming, and fencing.

At the gymnasium, that is to say, the place prepared for the practice of gymnastic exercises, fixtures adapted to the various exercises are usually found. The *bars* and *horizontal pole* are altogether peculiar contrivances for these purposes.

The *bars* consist of two horizontal parallel rails, eight feet in length, each of which rests upon two posts. The rails must be of solid, smooth, sound, and thoroughly seasoned wood. Their size should be such as to allow a firm grasp of the hand; they must, therefore, be rounded above, and not so thin as to hurt the body when a person places himself upon them. They must also be properly erected, especially with regard to the distance between them, which varies from eighteen to thirty inches, according to the age, size, and strength of the gymnasts. The posts must not be broader at top than the rail, but must increase in strength downwards, and be deeply set in the ground, so that they may stand with the proper firmness, and in such a manner that the strongest man cannot make them shake.

The *horizontal pole* should be at least two inches in diameter, entirely round, six to eight feet long, resting horizontally upon two posts, similar to one of the sides of the bars, the difference consisting in the perfect roundness of the pole and the considerably higher posts, which are also much thicker than those supporting the bars, the pole being set in them near the top, not upon them. The horizontal pole must be so high, that the person standing underneath can just touch the bar with his hands extended straight upwards. The pole must, of course, be of particularly solid wood, and must not turn, and the supporting posts should stand firm.

The simplest and easiest exercises upon the bars are : (1) swinging to and fro, with a hand upon each rail, keeping the arms and body entirely stretched ; (2) walking on the hands, one on each bar, the body perpendicular between the bars, and without moving the feet ; (3) jumping backwards and forwards with both hands, at the same time, the body and feet following the same rule as in the second exercise.

An exercise particularly good for strengthening the chest and arms is the gradual raising and lowering of the body, while the hands remain firmly upon the bars, and no other movement being allowed to the legs than the bending of the knees to avoid touching the ground. Swinging and rocking the body between the rails is also a very healthy exercise.

The exercises upon the horizontal pole are hanging, swinging, and oscillating, which admit of a variety of the most difficult feats.

In the two upper panels of *pl. 4*, two gymnasia are represented. *Figs. 1* and *2*, are the two positions of the body in jumping over a cord, the feet drawn up together and the feet stretched apart ; *figs. 3, 4, and 12 q*, are the vaulting horse ; *fig. 3* representing the raising of the feet on leaving the saddle ; *fig. 4*, the vaulting leap with closed feet over the crupper ; *fig. 12 q*, the leap up from behind. *Figs. 5 and 6* represent leaping with a pole, *fig. 5* being the side leap (lengthways), and *fig. 6* the upward leap (over a high object). *Fig. 7*, wrestling, one of the combatants being in the act of lifting his opponent from the ground ; *fig. 8*, dragging a load up a hill ; *fig. 9*, the cord stretched by weights between two posts, which are so arranged that the cord may be fastened at different heights between them, by way of practising leaps of various degrees of difficulty ; *fig. 10*, standing upon the hands, upon the bars, the head being downwards ; *fig. 11*, climbing forwards upon the rounds of a ladder. *Fig. 12 a*, the parallel bars ; *b*, horizontal pole ; *c*, balancing beam ; *d*, large mast with cross-trees ; *e*, posts ; *f*, cross-beam ; *g*, climbing pole ; *h*, leaning pole ; *i*, wooden ladder ; *k*, rope ladder ; *l*, ropes ; *m*, knotted rope (for climbing) ; *n*, iron rings attached to ropes, used for swinging suspended by the hands ; *o*, hand staples, and *p*, foot staples, for keeping the body extended horizontally in the air and in a secure manner.

Balancing arts, as they are often exhibited publicly for money by itinerant performers, are likewise represented in *pl. 4*, in the lower panel. Gymnastic performers of the present day frequently exhibit dislocations of the limbs the most contrary to nature, so that all the limbs of the body appear inverted. Feats of the last mentioned kind came from England to the

continents of Europe and America, having been originally brought to that island from the East Indies. Somersets form part of these feats, and we see, for example, at *fig.* 1, the backward somerset with the hands on the ground. The feats of the Bedouins which were exhibited in Europe originally by Bedouins, for instance the pyramids represented at *figs.* 2—4, are now frequently witnessed. We perceive further (*fig.* 5), balancing between two chairs, in which the equilibrist holds fast on the cross-pieces of two chairs, and then extends his body in the air, head downwards, and keeps on grasping higher and higher with his hands, until he reaches the topmost rounds. He also adjusts himself with the tips of his toes upon the top rounds of two chairs, which he then pushes slowly from each other, to such a distance that the extended legs are in an entirely horizontal position. Balancing upon the hands and feet, as represented at *fig.* 6, is frequently seen in our day; likewise athletic arts of every sort, especially large groups of athletæ, in which the athlete (*fig.* 7) supports upon himself three or more persons in different picturesque attitudes. The bottle dance (*fig.* 8) introduced from England into other parts of the world, is a feat usually shown at exhibitions, involving the very difficult task of balancing on the necks of bottles. Among equilibristics belong also the feats of jugglers, which are of East Indian origin, of rope-dancers, and circus riders. In the latter, which usually take place only at public exhibitions of itinerant performers, the rider displays his dexterity on horses trained for the purpose. He shows his skill in the management of these animals by standing with perfect ease upon a horse that is running round in the circus, or he dances, or leaps, or assumes upon its back the most difficult attitudes. The English are particularly expert in this art (an art practised, however, even among the ancient Romans), for which reason equestrian performers are frequently called English riders in some parts of the continent of Europe. Of late, however, Frenchmen, Germans, Italians, and Americans, have successfully rivalled the English; Frenchmen especially in training horses. The Italians excel as rope-dancers. The public having become surfeited with performances of this kind, it is essential, by way of compensation for the necessity of seeing again that which has often been witnessed before, that the most exquisite horses, brilliant ornaments, and gorgeous costumes, should be produced; and that scenes more comprehensive in their character, in which a larger number of performers take a part, should be introduced. Noble and splendidly furnished circuses are to be found especially in London and Paris. *Pl.* 5 represents scenes from Franconi's circus in Paris; *fig.* 1, a waltz; *fig.* 2, a quadrille on horseback; *fig.* 3, Olympic games.

Childebert I. erected a circus at Paris and Soissons, in order that the taste for Olympic games might in this way be revived; but his plan did not prove successful. In that age of true chivalry, tournaments alone possessed attractions for the people, and they retained their charm until, in consequence of Berthold Schwarz's invention of gunpowder, the mode of carrying on war underwent an entire change, and genuine knighthood began to decline.

The taste for riding exercises and racing became common at an early day

in England, and soon passed over to France, and with it also the love of equestrian performances. Large companies of equestrians were formed in the latter country; and one of the most celebrated of our time is that of Franconi & Laloue, who, in the year 1845, built at the extremity of the Elysian Fields the most magnificent circus of the age. It was capable of seating in its amphitheatre more than 15,000 spectators, and, although finished with painted boards, pasteboard, and paper, afforded a captivating spectacle by reason of its size and tasteful arrangements. It was burnt to the ground a year afterwards, but rebuilt even more tastefully.

The Scandinavians.

The Scandinavians inhabit the peninsula of Jutland, the Danish islands, the whole of Norway and the southern part of Sweden, in the Scandinavian peninsula proper, as well as the maritime provinces almost all round the Gulf of Bothnia; a great portion of the northern coast of the Gulf of Finland; also Run Island and a small part of the island of Æsel, at the mouth of the Gulf of Riga. In Finland and Livonia, also, traces of their former dominion are visible. They had, in the eighth and ninth centuries, but one language, the Norman or ancient northern, the language of the skalds in the Edda. They are at present split into three divisions: Norwegians, Swedes, and Danes. The Swedish language is divided into the pure Swedish (the written language of the country) and the modern Gothic, which is spoken in the southern part of the kingdom. In like manner, the Danish language appears to be divided into two branches, the pure Danish and the Norwegian, which are, however, essentially the same languages, all the difference being in the enunciation.

The Swedes have a tall, slender figure, white complexion, blue eyes, and fair or brown hair. In the female sex, ease and grace of movement are united to a good figure. The character of the Swedes is firm and serious; they are religious and fond of their native land, their laws, and liberty; honest, unselfish, moral, and courageous, and at the same time hospitable and communicative. They are acute in judgment, but less quick of comprehension than the people of Southern Europe, and are slow, also, in the undertaking and execution of their designs. The Swedes are fond of music and poetry. The educated classes are very refined; the lower ones, though industrious, are poor and ignorant, owing to their frequent excesses in drinking.

The Norwegians, although they are not favorably disposed towards the Swedes, resemble them very much in their mode of life and disposition; they are, however, more vigorous, still more serious, and also more temperate than the latter. They are admirable soldiers and still better sailors. The majority of them are husbandmen, and men of this class usually wear a leather or coarse cloth jacket, which is fastened by a broad girdle ornamented with a single buckle. Shoes and gaiters generally form a part of the holiday dress; a broad brimmed felt hat, or a woollen cap, covers the head. The females are renowned for their beauty more than for their

intellect. Though gay and fond of dressing and amusement, they are distinguished for their moral purity and domestic virtues.

The Dalecarlians, the inhabitants of Dalecarlia, a province in the north of Sweden (Nörland), have tall and large bodies, powerful but slender limbs, broad foreheads, deep-set dark blue eyes, high cheek bones, full lips, and broad, generally cleft, chins. Their long legs are singular, being nearly without calves. The women are somewhat stouter than the men, and have mostly broad, fresh faces, and small sparkling eyes. The disposition of the Dalecarlian is serious, quiet, and discreet. The sterility of their soil frequently compels them to seek employment in other provinces, often at a distance of two or three hundred miles from their villages. They travel, thus, for example, to the Lappmarks, where they labor in the smelting works. Others go to the metropolis (Stockholm) and take with them for sale, house clocks, wooden utensils, and other products of their domestic industry. They are everywhere liked on account of their honesty. Their dress is mostly the Swedish; but, in some valleys of Dalecarlia, the very ancient white national dress is retained, which consists of a cowl-like overcoat of heavy white woollen stuff, with one row of buttons and wide sleeves, knee breeches of the same material, shoes, and stockings. Women and girls dress in white linen jackets and caps, white standing collars, woollen aprons, and red woollen stockings. Their houses, which are of but a single story, are covered with shingles and painted red at the corners.

The Finns, now that Finland has been ceded to Russia, are to be found only in a few of the more northern provinces of Sweden. They are vigorous, hale, and hardy, and have round full faces and fiery eyes. They are stern and rough like their country, frank, hospitable, obliging, pious, and inoffensive. They are simple and frugal in their way of living, have much taste for music and poetry, and are skilful in mechanical employments. They are engaged chiefly in cattle breeding, but attention is paid also to farming, hunting, and fishing.

The Lapps or Laplanders (*pl. 12, fig. 5*, Laplanders in their winter huts) are of the same stock as the Finns, live in the extreme north, and have remained until the present time without the admixture of any other people. They call themselves Sami, and their country Samiland. The last traces of paganism have of late years disappeared from among them, and the entire body of the people is now Christian. They are small, have short slender legs, very small feet, a broad depressed face, large prominent cheek bones, and brown or black hair. Their eyes are dark, and are frequently observed to be bleared, in consequence of the smoke which fills the huts of these people; and the opening of the eyelids is long, but narrow. The large broad ears stand off from the head; the mouth is small, the color of the face yellowish-brown. Their body is not vigorous, but very hardy and flexible, and hence the Laplanders are capable of enduring very great fatigues. They are distinguished also for agility, and are usually faithful and honest, gay and cheerful. They are almost always laughing and singing; their songs, however, are very monotonous. They are very communicative, inquisitive, and timorous. Riches, which among them consist

almost entirely of reindeer, are of great importance in their eyes. Upon the whole they are temperate, but still very fond of whiskey and tobacco; and both sexes smoke and chew the latter article.

The Laplanders, according to their mode of life, are divided into Mountain or Reindeer Lapps, Forest Lapps, and Mendicant Lapps. Herds of reindeer furnish the first class with the means of subsistence. In summer they go into the mountains, and in winter roam about in the Lappmarks, on account of the wood found there. Their pyramidal huts, which are set up at their different places of sojourn, are about six feet high, and from fifteen to eighteen feet in circumference at the base. The floor is covered with twigs of the birch tree, upon which reindeer skins are laid. The entrance is small, and covered with a piece of cloth; and there is an opening above at the apex, through which the light enters and the smoke passes out. Stones are piled together upon the floor, in the middle of the hut, in the form of a parallelogram, and the fire burns in this inclosed space. When a place of residence is about to be changed, the huts, which are constructed of poles covered with coarse cloth, are struck, and placed upon reindeer. Rich Lapps frequently possess upwards of 1000 reindeer; the individual, however, who does not own more than 100 head is considered a poor man. The great usefulness of these animals to the Laplanders is well known.

The Forest Lapps have smaller herds of reindeer, which they drive into the forests to pasture. They practise fishing besides, and the Fishing Lapps support themselves almost exclusively by this means. The latter possess but few reindeer, which are pastured by the Mountain Lapps. The Fishing Lapps have both large and small boats upon the lakes. The larger vessels are purchased; the smaller, which are built by themselves, are fastened together only with ropes and roots of trees.

The Mendicant Laps are employed as herdsmen or day laborers, or go begging. These, as well as the Forest Lapps and Fishing Lapps, are, for the most part, impoverished Reindeer Lapps, who have lost their cattle by misfortune, or sacrificed them to their love of whiskey. Poverty gains upon them continually; and as more than two children are seldom found in a family, the number of people is constantly diminishing. The dress of both the sexes is very much the same. Reindeer skins, with the hair turned outward, constitute their winter coats. A long coat is worn under these instead of a shirt. In summer the coats are of cloth or leather. At the belt which holds the coat, hangs a sheath in which are placed a knife and other utensils; the tobacco pipe is also suspended at the belt. The shoes, made of reindeer leather, are filled with hay. The head is covered with a small cap, or a high conical red, blue, or green cloth cap, that of the men being somewhat higher than that of the female.

The Lapps are good hunters. Their guns are furnished with rifle-barrels, and very simple locks. Wolves and bears are the animals chiefly slain by them with this weapon. They shoot squirrels with cross-bow and bolts in order that the skin may not be injured. Reindeer are taken with ropes, which the hunters know how to throw in a skilful manner around

these animals. The Lapps employ their time in winter in making their clothes, and in manufacturing wooden-ware for sale, which they bring to market and purchase other articles with the proceeds. The sleighs of the Laplanders are very narrow, only one foot high, pointed in front, and are furnished with an upright board behind, against which the driver leans. When travelling on foot, large snow shoes are worn. These are boards cut out in the shape of a boat over four feet in length, fastened to the feet, and on which they glide swiftly along over the snow with great dexterity. Very recently, a great number of families have at length begun to construct fixed habitations for themselves, and to pursue husbandry and cattle breeding.

The Danes no longer resemble their forefathers. They have small, compact bodies, a mild disposition, are thoughtful, industrious, frugal, just, and fond of peace, not adventurous and warlike like their ancestors, and very hospitable, though cautious towards strangers. As respects dress they differ but little from the inhabitants of North Germany. The population of the towns and cities, especially on the islands, are generally thoroughly educated and devoted to the sciences and the fine arts. Society is very refined. They are less musical than the Swedes. The country people of Jutland and Friesland, as well as the peasantry of the islands, are more vigorously formed and have ruder manners.

The English People.

This people inhabit Great Britain and the adjacent islands. They are descended from a mixture of Celts, Gauls, Scandinavians, Saxons, Normans, and probably other tribes, who came over from the continent at different times; and each, in its turn, yielding more or less to the invader, withdrew to remote districts of the country, where they remained comparatively unmolested. Hence have arisen those sectional peculiarities, which so strongly characterize various portions of the British Islands; hence those differences of physiognomy, so well defined even at the present day; hence those varieties of habits and dispositions, which centuries have failed to efface.

The ancient Celtic or Gaelic language is still spoken more or less in Wales, in the Islands and Highlands of Scotland, in Ireland, and, till very lately, in the county of Cornwall; and remains of the Danish dialect may be found in the county of Northumberland, where the Danes were most thickly settled. But the English language is now spoken by all who have received the rudiments of education; like the people, it exhibits unmistakable traces of its miscellaneous origin, and the Saxon, Danish, Celtic, Norman, Latin, French, and Greek, with some others, contribute largely to its copiousness and significance.

Though the sectional distinctions of language are gradually becoming less conspicuous, the form and features of the several races still offer such marked distinctions as to merit particular notice. Among the English,

the head is somewhat flattened at the sides, but the upper part is well developed; the Scotch have the skull broad, and partially flattened at the back. The latter are also distinguished by high cheek bones and strongly marked features. The head of the Irish is narrower than that of either the English or Scotch, and the region immediately above the forehead is frequently much depressed. The forms of the English and Irish are more rounded than those of the Scotch, and the features are less prominent.

The differences of race are equally well defined in the mental characteristics as in the physical conformation of the natives of these islands. The Englishman possesses an energetic spirit; is industrious and fond of the useful sciences, and passionately addicted to the sports of the field. In private, he is a hospitable and agreeable companion; but in public he is reserved and unsociable. The English nobility are the only individuals in the nation who enjoy rank and privileges differing from those of the other subjects. They are mostly landed proprietors, and are mainly occupied with their legislative duties, the care of their estates, and the promotion of the arts and sciences by their patronage and example. The mercantile and manufacturing classes are those on whose industry the welfare of the community mainly depends, and the recent repeal and relaxation of many stringent laws affecting the operations of commerce are a striking proof of their growing power and ascendancy in political affairs. The mechanics and cultivators of the soil are, generally speaking, in a better condition than those of the same class in other European countries; but much distress has of late prevailed, especially among the agriculturists, into the causes of which it is not our province to enter. The Protestant Episcopal is the prevailing form of worship.

The Welsh, who, from the mountainous character of their country, have succeeded in preserving their primitive usages almost unimpaired to the present day, are the descendants of the original Britons. They are choleric, honest, brave, and hospitable. Proud of their nationality, they cling to their language as its most conspicuous symbol. This latter characteristic has been a great obstacle to the educational advancement of the people; hence, especially in the rural districts, much ignorance prevails. Several circumstances have occurred of late years which have drawn the attention of Parliament to the condition of Wales; and we believe a strenuous effort has been made to introduce the English language, as a preliminary step to the general improvement of the people.

The inhabitants of the southern part of Scotland have, by long and intimate association with the English, been divested of most of their distinctive traits; and in language, habits, and dress, a general similarity prevails between them and their southern neighbors. But the natives of the Highlands and the neighboring islands have not entirely lost their individuality; and though their picturesque attire, their habits of roving, and their continual feuds with each other and their Lowland neighbors, are now matters of tradition, and the ruthless Highland cateran has been converted into the peaceful drover, the primitive habits of former times may still be

found in remote districts, and the Gaelic language still lingers on the domestic hearth. However, the days of these relics of the olden time are numbered, and the steam car and the steam press are silently doing what the sword had failed to accomplish.

The Scotch are a bold and hardy people; industrious, thrifty, and persevering; shrewd and cautious in their business undertakings; honest, hospitable, kind-hearted, and friendly; proud of their country and its history. The lower orders are generally better instructed than the corresponding classes in England. The form of religion is the Presbyterian.

The population of Ireland is of Gaelic origin. As in the case of Wales, the ancient language of the country, which is a dialect of the Celtic, is much in use even at the present day, and probably with much the same disadvantageous results. But the social and domestic condition of the Irish is far inferior to that of the inhabitants of the sister kingdom. Though the land is fertile and the climate propitious, scientific agriculture, as a general thing, is unknown; the soil is not half cultivated, the manufactures are only nominal, and the great mass of the people are in a state of abject destitution. If we seek for the cause of this anomalous condition, we are lost in a maze of contradictory evidence; books and newspapers are filled with discussions on the subject, but the cause or causes elude the keenest research, and unhappy Ireland still remains an object of wonder and compassion to the whole civilized world. The prevailing religion is the Roman Catholic.

The character of the Irishman, like his physical conformation, exhibits distinguishing features from that of the English and Scotch. He is far more impulsive than either; bold, even to rashness; patriotic, generous, and hospitable; quick tempered; overflowing with fun and frolic, and witty by birthright; fond of music, singing, and dancing. He is, however, too frequently revengeful, extravagant, and idle; the slave of prejudice and superstition; and more inclined to repine at than to repair his moral and physical condition. The state of education is exceedingly low.

To return to the English, who, as the leading race, may be considered as the type of the national character of the inhabitants of the British Islands, we may remark that they are especially distinguished for bodily vigor, activity, and muscular strength. This characteristic is attributable to the fondness for athletic sports which is common to all classes; and yachting, hunting, racing, boxing, wrestling, cricket, quoits, and other manly exercises, which call for the display of skill and strength, are popular diversions. *Pl. 6, fig. 1*, represents a horse race. Races take place at regular intervals, on established race-courses, in different parts of the country, the most celebrated being at Ascot, Doncaster, Epsom, and Newmarket. They are attended by crowds of the nobility and fashionables, and royalty itself is often present. The prizes run for are made up by subscription. The betting is generally very heavy, and a favorite horse is frequently backed up to a large amount. *Fig. 2* represents a steeple chase, so called from some prominent object at a distance being selected as a goal, when the contending parties ride across the open country in as

straight a line as the numerous natural and artificial impediments admit. This is a dangerous sport, and many accidents have occurred from desperate leaps and headlong riding through every obstacle.

Pl. 7, fig. 3, represents a public meeting. The speaker is mounted on a stand, surrounded by his friends with banners and badges, and haranguing in a style which all acquainted with electioneering tactics will readily comprehend.

The Englishman's house is distinguished less by external splendor than by neatness, and an appearance of comfort which invests it peculiarly with the air of a home. As regards dress, the Parisian style is generally followed.

Agriculture has been carried to a high state of perfection in England; and the face of the country, with its trim inclosures, has the appearance of a continued garden to those coming from lands less highly cultivated. A knowledge of the theory and practice of the rotation of crops, draining, and deep tillage, is widely diffused; and the breeding and rearing of cattle, and farming stock in general, are carefully attended to. The working farmers are generally tenants of the large landed proprietors. Small properties are not common, partly in consequence of the operation of the laws of entail and primogeniture.

The Russians.

The Russians are, in general, of medium size, well set, and compact; have large bones, and full, solid, tough muscles, black or blackish-brown hair, twinkling black or blackish-brown eyes, and prominent cheek bones. Their Slavonic character is, in general, distinctly visible; of the higher classes only this does not always hold good. The latter have frequently not only perfect figures, but also a taller stature, on an average, than the lower classes. Blooming complexions are very rarely seen among the common people of Russia; the color of their skin passes into yellowish; and reddish or reddish-brown hair is very frequent.

With regard to dress, the Russians, even people of rank, still adhere to their old national costume. They bid defiance to the terrible cold in winter by long fur coats, warm boots and fur caps. The common people, however, only wrap their legs with bandages of linen, or pieces of woollen stuff or felt, and then cover their feet with shoes made of bast. Their fur coats are generally made of sheepskins; people of rank, on the other hand, often pay prodigious sums for the rarest furs. In summer, the common Russian leaves the head and feet uncovered, and wears no cravat; his cloth coat (*kaftan*) reaches below the knee, and crosses over the breast, where it is fastened by metal buttons. A girdle of woollen stuff, linen, &c., is worn around the waist. The merchants wear long cloth coats, which reach almost down to the feet, fit closely, and are buttoned over the breast. These coats are without pockets, and have numerous gathers on the lower part. They tie a silk sash around the body, and usually permit the beard

to grow long. The color generally esteemed in Russia is green, and most of the uniforms of the soldiers and civil officers are of that color. Women of the lowest ranks wear a short blue cloth petticoat, with a border of some other color. The stomacher is fastened with one row of buttons, and upon the head they wear a light-colored figured handkerchief, tied under the chin. Married female villagers conceal all their hair under the handkerchief; the unmarried, on the contrary, wear it combed smooth and tied together at the end with a riband (*pl.* 11, *figs.* 1, 2, and 4). The wives of the artisans and merchants are dressed with more taste. Their peculiar caps are usually of velvet trimmed with gold, and of divers forms; the most oddly shaped are worn in Kaluga. They are called "kokoshniks." Those worn on Sundays and holidays are made of gold brocade, and embroidered in flowers of gold and silver. The highest classes are dressed like people of the same rank everywhere in Europe. *Pl.* 10, *figs.* 4 and 5, country people of Little Russia; *figs.* 6 and 7, a Russian shopkeeper and his wife; *figs.* 8—10, fishermen of the Volga; *fig.* 11, wife of a citizen of Nishni Novgorod; *figs.* 12 and 13, country people from the district of Twer; *fig.* 14, girl from the Ukraine; *fig.* 16, peasant from the vicinity of Moscow. The peasants' houses of the Russians are usually log cabins (*pl.* 12, *figs.* 3 and 4).

The villages in Russia are mostly small, but long, as they have but one street. In the southern part of the Government of Voronesh, and in many other regions of Russia, however, we find also large and handsome villages, where the houses are built of stone. The people of Little Russia have houses of loam and wicker-work, that are whitewashed within and without. The villages in the military colonies present a very cheerful appearance, especially those of the German colonists.

The villages of the Don Cossacks are composed, for the most part, of well built, neat houses. The dwellings of the Tartars upon the shores of the Crimea are neater than those of the Russian common people and Poles, and their roofs are generally flat. The Esthes and Lettes do not live much better than the Poles and Lithuanians. The habitations of the Finns usually present a very miserable appearance; a few holes supply the place of windows, and a breach in the roof serves in place of a chimney. Those on the sea coast are better than those in the interior of the country.

The serving classes (peasants and menials) are still, as a general rule, treated very harshly. The opinion that the Russian can be governed only by blows, is too deeply rooted. The usual punishments are blows of the knout, in which the distinction into the great and small knout is made (*pl.* 11, *figs.* 4 and 5).

Hospitality is everywhere met with in Russia, owing in a measure, probably, to the general cheapness of victuals, which are only more expensive in a few districts. The Russians are fond of social pleasures, and hence like to meet in their domestic circles for the purpose of amusing themselves. The long winter evenings are devoted, in particular, to these social gatherings, where, after work is over, they have a very merry time of it. You not unfrequently see rural farces and regular masquerades performed by

the young people of both sexes, who flavor them with jokes, sometimes of a rather practical nature. A game of forfeits, or a dance to simple music, usually closes the whole affair. The older people amuse themselves meanwhile with card playing, draughts, or chess. The two latter games are in universal favor. Russian country people not unfrequently practise, as a pastime, jumping on a board and bone-playing, in the manner represented in *pl.* 11, at *figs.* 1 and 2. Skating, sledge riding, and sliding down the ice-course, are, in winter, next to dancing, the principal recreations. The peculiar structure called the ice-course, or gliding-hill, is represented in *pl.* 12, *fig.* 1. The Russian national dance, which is pantomimic in its character, and in which the woman at one time approaches the man and then retires from him, is represented at *fig.* 3. At the entertainments of people of rank in the principal cities of Russia, great abundance and luxury prevail, regulated by a refined taste. The wealth is displayed chiefly by the number of servants and by the abundance and splendor of the tables, at which, moreover, there are no rules of precedence, the most distinguished persons often sitting in the midst of unimportant characters. Good wines, chiefly champagne, are provided in abundance.

The Russians are accustomed, from childhood, to frequent bathing; even the poor Russian peasant bathes at least once in the week, or oftener. As each house has its bath room, the bath is not refused even to the beggar, still less to the guest. It is a singular circumstance, that both sexes, at least among the poorer classes of the people, bathe promiscuously. (*Pl.* 11, *fig.* 3, a Russian public vapor bath.)

Petty thefts are not unfrequent in Russia; highway robberies and burglaries, on the contrary, are almost unknown there. A Russian, moreover, will not steal household utensils, in his own country; such articles are inviolable with him, and he lays hold of other things to which he may have taken a fancy. Hoffman, in speaking of the pilferings of the Russians, says: "My love for the Russian nation, which I have no desire to conceal, need not prevent me from mentioning some things which cannot be reckoned among those worthy of admiration. Where, however, so much kindness, such a groundwork of true moral feeling exists, as is the case with these unsophisticated men, it cannot be difficult also to extirpate these remaining blemishes, even to their last vestiges. The most certain known means of protection against a thief within doors, is to take him into your own service. From that moment you are certain not only to be robbed no more by your new domestic, but to possess in him also the best guard against all other thieves, as it becomes with him a *point d'honneur* to repress all pilfering, by reason of which suspicion might fall upon himself; the opinion being held by the mass of the common ranks of life, that he may perhaps steal certain articles of trifling value from strangers, without on that account being considered directly dishonest; but to defraud his own master, according to his idea of the matter, is a heinous and inexcusable sin."

The Russians of the lowest classes are accustomed to simple fare. Buckwheat groats, and, among the inhabitants of Little Russia, millet groats, are frequently eaten: sour kroust, pickled beets, onions, cucumbers,

and dried fish, are favorite food; and in the evening, milk, honey and bread constitute the frugal supper. The bread is mostly baked of rye meal, crushed wheat, and buckwheat meal. Meat is served only on Sundays and holidays. *Quas*, or *kwas*, is the usual drink, as well among people of the higher as among those of the lower classes of society. This beverage is composed of water and meal, or malt, has a sour taste, and may be compared to sour small beer. It is often improved by lemon peel and spices. In winter a warm drink is commonly prepared from water, honey, and Cayenne pepper, which is called "*sbitin*." In the western part of the Russian Empire, a great deal of mead is consumed, and whiskey is a customary drink throughout the country. Expensive as is the latter, even the poorest man contrives to procure it. Drunkenness is rather common in Russia; and the Russian not only sympathizes with an intoxicated man, but has a kind regard for him, and lends him a helping hand as if he were a saint. This arises, perhaps, from the fact that the common people know full well that they have often been found in the same condition, and may often get into it again. It is remarkable that the Russians, even under the influence of whiskey, are uncommonly peaceable. The quarrelsome Russian is rendered meek by this fluid, and disputes and brawls seldom occur among drunken persons. The bitterest enemies, when drunk, treat one another like the tenderest friends. Tea, also, in large quantities, is drunk in Russia.

We mention, in conclusion, a few of the Russian festivals. The merriest time for the Russian is the so-called "butter week," the Russian carnival; since at the close of this week the Easter Lent commences, a fast which continues fifty-six days. It has obtained its name butter week (*masliza*) from the circumstance, that in it, if even no meat, yet a little butter, milk, and eggs are permitted to be eaten. The *masliza bear* is one of the sports of the season. A man in a bearskin is the principal figure. Seated on a low sleigh he is drawn all about town amidst unlimited fun. Whiskey, of course, is the grand stimulus, and the bear is allowed his due share. The *Semick* is a popular festival held on the Sunday after Ascension day, a kind of celebration of spring, which has come down from the times of Slavonic heathenism. At Christmas masquerades are held, known as *akrutshniks*, and which last a fortnight. Easter week, which concludes the long period of rigorous fasting, is celebrated by all classes of people with great rejoicing and universal merry-making. On Easter day at midnight all church bells toll, calling to solemn worship, and everybody goes to hear the night mass. The universal salutation between friends or strangers on Easter day is the phrase, "Christ is arisen;" to which is answered, "He is in truth arisen." On Easter Monday presents of Easter eggs are given and received. All kinds of gifts are, however, on this day called Easter eggs.

On the sixth day of January, at the feast of the Epiphany, the consecration of water, in remembrance of the baptism of Christ in the Jordan, is celebrated in Russia, principally in St. Petersburg, with great pomp (*pl. 7, fig. 2*). The celebration is held upon the ice of the Neva. A hole is cut

in the ice, which is named the Jordan. After the customary prayers, the priesthood repair thither in their richest robes, followed by the imperial family and the entire court. All the troops are under arms with flying colors. One of the priests hereupon consecrates the water of the Neva, dipping the holy cross thrice in the flood, and pronouncing the words of consecration. Then he fills a vessel with the water, with which he sprinkles the clergy and all other attendants. Discharges of artillery conclude the solemnities proper. As soon, however, as the court have withdrawn, all hasten to the Jordan to fetch water for themselves, which, according to the opinion of the common people of Russia, will remain for years pure as the clearest spring water, and will have the power of healing diseases.

On the evening previous to the feast of St. John, bonfires are kindled in many places, which are visited by processions of the people (*pl.* 12, *fig.* 4).

Pl. 10, *figs.* 1-3, represent characters from the early history of Russia, to wit: *figs.* 1 and 2, two Strielzi; and *fig.* 3, a soldier of the old Russian Polish Guard. The Strielzi or Strolzi, signifying riflemen, were a Russian militia established in the latter part of the sixteenth century by Czar Ivan Vasiljewitch as his life-guards. They numbered from 30,000 to 40,000, and were clad and armed entirely in the ancient Russian style. The Strielzi were the best troops of the Russian army at that time, but stubbornly attached to their ancient regulations and privileges. Indeed, they soon acquired the general consequence and character of the Janizaries. They rebelled more than once; and Peter the Great at length found himself under the necessity of disbanding the few remnants of the once formidable body, in 1705.

The Russians are the most important of the Slavonic nations, partly on account of their prodigious number, and their extension over a very large territory, partly on account of the commanding position maintained by their sovereign in Europe. The Russian race rule from the Black Sea to the Arctic Ocean, from the Vistula and Wartha as far as Kamschatka and Sitka. The Russians are usually divided into: (1.) Little-Russians, who inhabit the entire southern portion of Russia, Galicia, and the northeastern part of Hungary; (2.) White-Russians, along the borders of Poland and Lithuania, bounded by the territories of the Little-Russians in the south, the Great-Russians in the east, and the Novogorodians in the north; (3.) Great-Russians, or the Russians proper, who form the centre of the Russian power; (4.) Novogorodians, the inhabitants of the former republic of Novogorod, whose independence was superseded by the monarchical rule of the Great-Russians.

The Russian territory includes not only European, but also Asiatic and American countries; and Asiatic Russia comprehends almost one third part of the whole continent of Asia. The inhabitants of Asiatic Russia are partly of Slavonic stock (Russians and Cossacks); partly Finns (Permians, Woguls, Tchuwaches, Tcheremisses, Wotiaks, Morduines, Ostiaks); Tartars (Tartars proper, Karakalpaks, Bashkirs, Kirghiz Teloites, Yakoutes); Armenians, Circassians (Lesghians, Kistes, Ossetes, Circassians, Abasians,

Mingrelians, Imeritians, Georgians); Mongols (Calmucs, Burates, Tunguses, &c.); and finally, the inhabitants of the extreme north, Samoyedes, Ostiaks of Narim, several East-Siberian tribes, as the Kamschatkians, Koriaks, Tchouk-tches, Kuriles, Aleoutes, and Europeans and Asiatics of other stocks scattered in different parts.

We shall give the characteristics of most of these stocks under this head, although they properly belong to the section relating to the people of Asia.

The Cossacks (*pl. 1, fig. 4*, and *pl. 10, fig. 15*) are a stock of people in Little-Russia, who probably derive their name from the word *kosack*, a word which in Turkish signifies "robber," but in the Tartar language, "light horse." Apparently, they are of Tartaric origin. The form of their bodies is, in general, handsome. Their language is the Russian, with which, however, they have mingled many Polish, Turkish, and West European words. They live in small houses, fifty or one hundred of which constitute a village (*stanitza*). These villages are situated upon rivers, have unpaved streets, one or more churches, and an earthen rampart as a fortification. The occupations of the Cossacks consist, in time of peace, in the rearing of horses, sheep, and bees, in horticulture, and the cultivation of the vine. Their agriculture embraces the ordinary products of the fields, and they manufacture whatever is necessary in their households. Tradesmen proper are also found in many places. In time of war they serve as light cavalry. Their principal weapon is the lance; but they have the sabre and pistols besides, and in case of necessity also bows and arrows. In a regular attack only the fine truly military regiments are employed, especially the Don Cossacks; the others are formidable on account of the great steadiness of their small horses, and their indefatigability in oft repeated charges. They are the terror of flying enemies, and fearful in their attacks upon the baggage. Their assault is irregular, and with a loud hurrah. They are employed chiefly in the advanced posts service and as patrols, being distinguished for the extraordinary acuteness of their senses. The regiments are not all dressed in uniform. The Don Cossacks of the guard have a uniform consisting of a blue jacket, wide blue trowsers, and a fur cap with a light blue or red bag at the top of it, or a blue cloth cap with a red band. The black leather belts are ornamented with silver or tin. Dress, arms, equipments, and horses are provided by them at their own expense. The Cossack sits very high upon his horse, as the saddle forms a soft round cushion very thickly upholstered, under which he moreover keeps his clothes and booty. Their commander-in-chief is only confirmed by the Russian government, being chosen by themselves. According to their different districts, they are divided into regiments or *pulks* of 500 to 3000 men, commanded by a colonel (*ataman*, *hetman*, *pokolnik*); and companies led by a captain (*sotnik*), the company always having an ensign (*kharunsha*). A commander-in-chief (*ataman*, *voiskovi*), holding the rank of general, commands the collective body of all the regiments. The rest of the officers do not hold any military rank; and it is considered no disgrace among the Cossacks to be at one time an officer and at another a common soldier. The time of service from the

eighteenth to the fiftieth year. They are estimated at about 800,000 fighting men; the whole population, however, at three millions. From the collective body of the Cossack pulks the tallest and finest-looking men are usually formed into Cossack guards. In the war of 1812-14, the Russians had recruited peasants also, who went to war in their peasant dress, and were known as peasant Cossacks. *Pl. 12, fig. 2*, serfs on the Don upon the march.

The Tartars are slender and of medium height, have an oval head, handsome regular features, small, sparkling, mostly black eyes, a fine, downwardly arched nose, small lips, strong white teeth, and dark hair. In their movements they are active. The men are more lively than the women, and the latter rouge their faces and dress very untastefully. They are frank, hospitable, and friendly towards strangers, neater, and more orderly than their neighbors, fond of comfort without being lazy, and jealous of their honor. They are of the Mohammedan religion. Reading and writing are taught in the schools, and the girls are instructed also in sewing and the art of embroidery in gold and silver upon leather. The male dress usually consists of a linen shirt; a fancy striped, long, close-fitting undercoat of half silk stuff; linen or chintz trousers; a fancy colored overcoat, somewhat like a dressing-gown, manufactured of cotton or linen stuff, and a handkerchief of similar material that is tied around the waist. Their yellow or green morocco boots have soft soles, and their slippers of the same, or of sheepskin, are without heels. Instead of a turban, the poorer people wear a fur cap. In winter, the sheepskin coat and other articles of the Russian dress are worn.

Females wear cotton or silk (usually red) chemises, with long sleeves hanging down over the arms, wide trousers, leather stockings, and a dress of fancy colored stuff, fastened with a neat clasp. Their finery consists of a string of beads, with coins, small plates of metal, and gilt balls; or instead of this necklace, a case with amulets or perfumery; bracelets adorned with pearls and stones, and golden ear and finger rings. They blacken their beautiful teeth with a powder of copperas and nutgalls, and paint their nails red. The head-dress varies. Some wrap a handkerchief around the neck and head, in such a manner as to leave only the face uncovered; and many place over it a net, from which long cords hang down behind. *Pl. 16, figs. 4 and 5*, a Tartar family.

A portion of the Tartars have permanent places of abode, and dwell in wooden buildings, with windows of glass or mica (among the poor, of fish skin or oiled paper). The roofs are usually flat. The nomadic Tartars are less neat, and live in small buildings without windows, and with an opening at top instead of a chimney. These tents are not taken apart when a migration occurs, but are removed on carts as they stand, from one spot to another.

The Tartars collectively are a free people. Their princes are called *Mur-ses*, their chiefs *Baschliks*. The *Mufti* is their spiritual head; the higher priests are termed *Achums*, the lower, *Mollas*. Their mosques are known as *Medsched*.

They are expert in riding to an extraordinary degree, and sometimes have horse races. (*Fig. 6.*)

The Caucasians, that is to say, the nations which have inhabited the Caucasus since the historical era, form three great divisions, according to their languages, viz., the *Lesghi*, or East Caucasians; the *Mizdshegi*, or *Kistes*, Middle Caucasians; and the *Circassian* and *Abasian tribes*, or West Caucasians. Many other nations, as, for example, the *Ossetes*, *Georgians*, and *Bassians* (the last of Turkish origin), settled in the Caucasus and its southern borders only in later times.

The Lesghi, Lesghians, or Lesghines, are the inhabitants of the eastern part of the Caucasian range, lying between the Koisu, the Alasane Rivers, and the plains on the shores of the Caspian Sea, and which is called by the Turkish and other Asiatic people, *Daghestan*, i. e. "hilly country," or *Lesghistan*, i. e. land of the Lesghi. The Lesghi are divided into numerous small tribes of people, most of whom have lived in the Caucasus for a very long time, as even Strabo and Plutarch speak of them; they appear to have mixed since with other stocks. Klaproth conjectures that the Avari, a Lesghian tribe inhabiting the Chundsah, might perhaps have descended from the ancient Avari, who were the second branch of the Huns. Like all Caucasians, the Lesghi are savage, cruel, rapacious, and always ready to serve any one who will pay them. Their daring courage often borders on foolhardiness. Their weapons are gun, sword, and dagger, which are used with great dexterity; they are, however, good archers also (*pl. 15, fig. 18*). They are as good footmen as horsemen, and bear the fatigues of a campaign with great patience, provided their pay is only regular. Their bravery is so great, that their participation has decided many battles. Most of the Lesghi are Mohammedans of the sect of the Sunnites; among a few stocks, however, faint traces of Christianity are still found. The most powerful stocks are the Kasi-Kumucs, Avari, Akoo-shahs, and Koulitshi.

The Mizdshegi or Kistes, to the west and north-west of the Lesghi, are still more decided robbers than the latter, and the Russians have as yet failed to subjugate them. The most barbarous of them are the Tshetschentzes, the stock inhabiting the country watered by the Gicha, Farthan, Argun, and the Dsahlk Rivers. To the west of them live the Karabulak; and the westernmost stock are the Ingoushes, who are less rapacious, and almost entirely subjected to the Russians.

The Circassians and Abasians of our day inhabit the country extending from the Upper Kuban to the Black Sea.

The Abasians (*pl. 10, fig. 24*) appear never to have left the coasts of the Black Sea and the western part of the mountain range. They call themselves *Absne*, or *Abene*; they are termed, however, by the Russians and Turks *Abasa*, and by the Georgians *Abchassi*, from which Europeans have made *Abases*, *Abasians*, *Afjases*, *Abgasetes*, &c. They resemble the Circassians in manners, dress, and ceremonies, their languages being also related to each other. The Abasians are agriculturists, but live chiefly by cattle breeding. Their large and handsome breed of horses is renowned. Their possessions extended in former times to a much greater distance than

at present, the Circassians having pushed them back to the mountains. They became converted to Christianity by the Byzantine emperors. In the eighteenth century, however, they were reduced to subjection by the Turks, and compelled to adopt Islamism. Subsequently, in the year 1771, they revolted against the Porte and returned to their ancient superstition, which they preferred to newer doctrines. Piracies are frequently committed by them; their vessels, however, are mere rowing boats, and being without cannon are not dangerous, at least to ships of war. In earlier times, many young Abasians went to Egypt, and there sold themselves as slaves to Mamelouks and to the princes of the country, in order, in this way, to make their fortunes, and by personal valor to obtain a distinguished military position; and many have actually succeeded in attaining these objects. The Abasian women are handsome, and as much in demand for the Turkish harems as the Circassians.

The Circassians inhabit Great and Little Kabardah, and the country beyond the Kuban, as far as the Black Sea, call themselves Nobles, and were known in the middle ages as Sikhs. Formerly they dwelt still further towards the north, but have been pushed back by the Russians below the Terek and Kuban Rivers. Those inhabiting Great and Little Kabardah are usually called Kabardes, or Kabardines.

The people are divided into five strictly defined classes. The class of "psheh" comprehends the princes; the second class, the ancient nobles, who are called "*work*" in the language of the country; the third class, the freedmen of the princes and ancient nobles, who, however, remain bound to serve in war under their late lords; the fourth class is composed of the freedmen of the new nobles; and the fifth, of the serfs, "*tchokotl*," who are partly the property of the higher classes and partly of the country people. The several branches of the princely families have again families under them, and under the latter are peasants as hereditary property. The nobles together with their serfs can pass over from one prince to another. In this manner certain princes acquire ascendancy over others. Nobles and princes are lords of the serfs, even as far as life and death are concerned. Before Islamism was established amongst the Circassians, the princes had, however, still greater privileges than at present.

Old age is held in high respect by the Circassians, and hence the most aged of each class meet in council on important affairs. There are neither fixed places of administering justice nor written laws. Judgment is passed according to old usages; the meeting, at which the princes preside, are held in the forests, and at them almost all matters are judged. If the family of a slain person do not demand the blood of the murderer, but are willing to enter into a composition with him, the assembly assesses the fine, to be paid down by the slayer. The disturber of the public peace is also fined in money, and thieves who are caught in the act are obliged to restore many times the value of the stolen articles. Thefts accomplished with adroitness, however, do not bring disgrace upon the perpetrator, but are considered almost as meritorious as skilfully executed expeditions of war. Hence all take pains to learn the art of stealing cleverly; and the greatest

reproach which a girl can make to a young man, is to say to him that he has not been able to steal even a cow.

Hospitality is esteemed a sacred duty by the Circassians, and is fully carried out among them.

When a child is born to a prince, the father prepares a great festival. If it is a son, he delivers the child, on the third day after its birth, to one of his nobles, to be brought up by him. The guardian obtains a wetnurse for the child, and she gives him a name. The son never visits his father before his marriage, hence the love of both towards each other cannot be very great. The person who inquires after the health of the consort and children of a prince commits a grave offence against the laws of etiquette, and excites great indignation on the part of the latter by such a proceeding. Sons of noblemen are committed to the care of a guardian of similar rank, but not until their third or fourth year. The tutor chooses the consort for the young prince; and, when the presents which the parents of the chosen bride are entitled to have been offered and accepted, the prince, accompanied by a friend, kidnaps the lady, the companion taking her before him upon his horse. They then ride at full gallop to the house of the bridegroom's parents, where the friend introduces the bride. She thereupon is conducted to the chamber selected for the newly married couple, where she awaits the bridegroom. The young groom remains in the forest until he is called by his friend, and conducted by him into the presence of his wife, which is not done before all the inmates of the house are supposed to be asleep.

The Circassians are, in general, well formed, and the men in particular are distinguished for their handsome figures; and as they employ every means to keep themselves slender, fine forms are very common. They are of medium size, of great nerve, and only very rarely stout. The shoulders and chest are broad, but the lower part of the body is very narrow. The hair and eyes are brown; the head is high and narrow, the nose thin and straight. The Circassian women are always deemed the handsomest in the entire Caucasus, yet those of Georgia greatly excel them in beauty. A turned up nose and red hair are not uncommon amongst them, but are never found amongst the Georgians.

The men wear their beards, or at least moustaches, but shave off the hair of the head. The dress is easy and neat. The head is covered with a cap sometimes higher and melon shaped, sometimes lower, stuffed out with cotton and quilted. People of distinction wear it generally of white color trimmed with gold and silver lace, the lower classes of dark color edged with fancy colors. Upon each side of the breast of the short light coat is found a pocket sewed throughout in such a manner as to form numerous tubular divisions, which are used as receptacles for cartridges. The long trowsers fit closely, and with men of rank are frequently ornamented with gold and silver lace; and the morocco boots, which might with greater propriety be called socks, are adorned in a similar manner. The lower garment is of fine light stuff, and mostly white. Over this, the man of rank wears a shorter rich waistcoat, either with or without a skirt. The latter,

if present, is made of thicker material, of cloth or fur. Upon state occasions princes and nobles wear a coat of mail and full armor, instead of the under garment. This coat of mail is ingeniously composed of polished steel rings; and from the hinder part and sides of the helmet, made in a similar manner and pointed at top, a piece of the same durable network hangs down and serves as a defence to the neck and shoulders. The armlets also are of polished steel. A broad black belt is tightly fastened above the hips, and serves at the same time as a receptacle for the dagger and pistols. A narrower one hangs around the hips, supporting the bow and quiver with the arrows. The sabre seldom leaves the side of the Circassian, even in the house. The common people wear clothes made of coarser material, and almost always over them a cloak of full shaggy felt, which they call *burki*, and do not willingly lay aside even in the greatest heats of summer. When the Circassian of the lower classes walks or rides abroad, and takes with him neither sword nor gun, he never omits to arm himself with a long, strong stick, furnished at top with a heavy iron knob, and at bottom with a sharp ferule of the same metal almost two spans long, which he can use also as a javelin. (*Pl.* 10, *fig.* 17, Circassian prince of the Great Kabardah; *fig.* 18, Circassians of rank in the house dress; and *figs.* 19 and 20, in war equipments.)

The women cover the head with a white cloth which lies flat over the forehead and is fastened under the chin; but the girls wear caps with embroidery and lace similar to those of the men. The hair is braided into a thick plait behind, which they cover over with linen. The under garment reaches to the ankles, and has long sleeves. It is open in front and held together by lacings; the over gown, whose sleeves are cut open, is not fastened at top in front. Women of rank choose different fancy colors and fine stuffs for these articles of dress, and trim them with gold and silver lace. Married women wear wide trowsers, and all cover the feet with close-fitting boots or rather socks, ornamented at the edges with embroidery or lace; and over these, when going abroad, they put on stilt shoes. A broad belt or corset is secured or fastened with clasps around girls after the tenth year, which compresses the waist very much, and is not to be removed before their marriage. This small wasp-like waist is considered a great beauty amongst the Circassians, as it frequently is among Europeans and Americans also, much to the detriment of health; and in order that it may be retained for as great a length of time as possible, but scanty food, chiefly pastry and milk, is given to girls. The men also, as has been remarked above, endeavor to preserve their slenderness of figure.

Concerning the habitations of the Circassians, Pallas observes: The Circassians live in villages, which they desert from time to time either on account of increasing uncleanness or insecurity, &c., taking with them only the best spars and timbers of their dwellings, after having burnt the remainder. They then choose another convenient site for their village, and in case they do not find water in the immediate vicinity contrive to conduct it thither by means of dams and small canals. They build their

dwellings close together in one or more circles or parallelograms, so that the inner space may afford a large cattle-yard common to all, which has but one gate, and is entirely shut in, and thus in a measure defended by the houses.

Outside of the circle stands the house of the prince, which consists of a greater number of apartments ; and here and there are also single buildings for the reception of strangers. Round about are placed hay or corn-houses, as well as large baskets securely set in the ground, and furnished with covers, in which the threshed grain is stored up.

The houses themselves are oblong parallelograms 20 to 30 feet broad, made of wicker-work, closely plaited, and covered with loam within and without. Upon the top of the wicker-work rests a flat roof of light spar-work covered with turf. The wife has a larger, the female slaves and girls a smaller chamber ; the husband usually occupies a separate dwelling. Some tribes of the Circassians fortify their villages by propping up thick posts crosswise against each other, and filling up the interstices below with earth, and those above with thorn bushes.

The principal food of the Circassians is millet softened with water. They also make of it a kind of bread, as well as their usual drink, which is called by them "handkups." Carrots, turnips, onions, pumpkins, and watermelons, form, moreover, a part of their ordinary fare. Mutton, beef, and game, are often eaten by them. Honey, obtained by means of their careful rearing of bees, is converted into mead by the infusion of hot water, or is mixed with the "busa," a strongly intoxicating drink, brewed from millet and fermented. It is also eaten, and the wax obtained from it is an important article of commerce with the Circassians.

The herds are numerous, the country possessing beautiful pastures that furnish sufficient food for cattle, sheep, goats and horses. The sheep have fat tails and fine wool, and out of the latter the women weave very strong woollen cloth. Wool, as well as cloth and ready-made clothing, the latter being also manufactured by the women, are sold also to the neighboring states. The black cattle are of a small breed, and are used as draught cattle. The horses are exquisite, and in fact the best after those of Arabia. They rove freely over the fields, and never go into a stable. The agriculture of the Circassians is very simple. In spring they burn the herbs that cover the fields, meadows, &c., and this is the only manure that they give them. The soil is then ploughed and harrowed, the harrows being trees having the foliage still remaining on them. The dance of the Circassians is peculiar. Their games are founded upon activity, strength, and skill.

The Georgians differ from the rest of the inhabitants of Caucasia in language and form of body. In the north they are bordered by the Caucasus, and in the south separated from nations of different language and origin, by the river Kur, in the mountains of Karabag, Pampaki, Tshildier, and Pontus. Their name is derived from the word "Gur" or "Kur," which is the present name of the river Cyrus of the ancients. The country is called Gurgistan by the Persians, Gurtsh by the Turks, and

Grusia by the Russians: in ancient times, however, it was denominated Iberia, and comprehended ancient Albania and Colchis. Since the earliest times the Georgians have enjoyed greater civilization than the northern mountaineers. Their history proper begins, however, with the introduction of Christianity in the fourth century. Nevertheless their old traditions are mixed up with biblical history, as they maintain that the ancient Georgians sprang from Targamos, a descendant of Japhet, on which account they call all people belonging to their stock Targamosians. The true Georgians of the present day denominate themselves "Kart-uhli," from Kartlos, the son of Targamos.

The Georgians are divided into four main branches. The first, the Georgians proper, live in Kartli, Kacheti (ancient Albania), and Imeritia, extending to the banks of the Tscheniss-Skali, a tributary of the Phasis. The Pshawi and Gudamakari speak the Old Georgian language, which is very different from the New Georgian (Grusian or Iberian); still they must be reckoned with this stock. They inhabit a few narrow valleys of the high Caucasus, eastwardly from the Upper Aragai River.

The inhabitants of Mingrelia (ancient Colchis), Odishi, and Guria, constitute the second branch, speaking a rude dialect intermixed with many foreign words.

The third branch, the Suani or Snaw (Tson), speak a dialect differing still more, and which has received many Caucasian words. They inhabit the high mountains of Caucasus, westwardly from the Elboors and northwardly from Imeritia, as far as the sources of the Tscheniss-Skali, Enguri, and Egrissi. They are independent, and are considered the most uncleanly in their habits of the inhabitants of the Caucasus.

The Lasi (Turkish, Lash), who constitute the fourth branch, are barbarous, rapacious mountaineers, along the Black Sea, from Trebizond to the mouth of the Tshoroki or Thoroch, which separates them from Guria.

The Georgians have a vigorous frame, tall figure, generally handsome, sharply chiselled features, black, finely formed eyes, and a large nose, which is often aquiline, but less of a Roman than a Jewish outline. Their carriage is proud, the gait is somewhat swinging. A recent writer says: "The men and women of Imeritia are world-renowned for their beauty. No race of men in the wide world equals the people of Imeritia, Mingrelia, Guria, and Adshari, in symmetry of limb, and regular beauty of the physiognomy. In these respects even the slender heroic figures of the men of Circassia are inferior. In the solitary forests of Mingrelia I at times saw true ideals of the handsomest male figures, that might have served as models to a Thorwaldsen. The Georgians inhabit a country which until lately has been continually exposed to the incursions of foreign nations, for the Russians have but recently obtained possession of the land, with the exception of a small portion of Guria and Lasi yet belonging to the Ottomans. In consequence of this state of things, the Georgians have been under the necessity of always standing upon their guard as well against the Ottomans as against the Persians and Lesghians. This position in the midst of these nations has rendered the Georgian warlike; but as he does

not belong to a numerous tribe, he has been compelled to fight against forces vastly superior in numbers, and has accordingly accustomed himself more to a partisan warfare than to regular battles." The Georgians are excellent horsemen and very brave; they are upright and trustworthy, but at times somewhat rude; hospitable indeed, but not very friendly and polite; ingenious and quick of apprehension, but ignorant in the highest degree. The people of the country, though they do not display the pride that characterizes the men of rank, yet by their tone and entire manner betray their martial character, as in general the Georgians have acquired the virtues as well as the vices of soldiers. Georgians practise farming, and cultivate the vine to a large extent, as a great deal of wine is consumed by them. Silkworms are reared, and cattle, principally sheep, raised. They have not, as yet, entered upon the practice of the industrial arts to any extent. Their domestic life is very plain. The carpets upon which the Georgians sit with their legs turned under them, according to the oriental fashion, constitute almost their only furniture. Rich and poor live in the same manner, with the exception of a few people of Tiflis, who endeavor to imitate the Russians. Their dress is very comfortable and good, and consists mostly of woollen material. The women wear trowsers, are initiated also in all the arts of the toilette, and even take pride in rouging very handsomely. Their dress is modest, and shows to advantage the beautiful slender figure, the regularity of the features of the face, the fairness of the complexion, and the inexpressible mildness in the glance of the eye. The reader will best learn the dress from the representations given by *pl. 10, fig. 25*, a Mingrelian girl; *fig. 26*, and *pl. 15, fig. 15*, an Imeritian prince (overcoat orange, under garment and breeches green, boots yellow, no stockings, the legs naked to the knee, hat yellow); *pl. 10, fig. 27*, Georgian prince; *pl. 15, fig. 16*, a Georgian female of the higher ranks. Gown scarlet, head-dress and veil white, sash yellow, ornaments on the head-dress and gown golden; *fig. 17*, a Mingrelian of the lowest ranks carrying the produce of his rich vineyard to market. Overcoat green, under dress and breeches scarlet, straw hat yellow, sash striped yellow and red, shoes black, worn over short yellow boots.

The Calmucks, (*pl. 12, fig. 10*), who call themselves "Derben-Oret," that is to say, the four united nations, are an offshoot of the Mongols, and form four hordes: the Choshoutes, the Soongores, the Derbets, and the Torgots. They live on the Lower Volga and in Central Asia. They formerly professed the religion of the Shamians, but afterwards embraced the doctrine of Fo; nevertheless their chief-priests ("lamas") are independent of the highest priest ("dalai lama"), having broken off all intercourse with his residence. The "gelungi" (priests) are subordinate to the chief-priests, the "gezuli" are subordinate to the gelungi, and the "mandshikami" to the gezuli.

When the camp is broken up, the *kibitkas* (houses), in which the temples of the idols are kept, are likewise removed from one place to another. The priests form the tenth part of the entire nation, and as they neither pay taxes nor perform any duty necessary to the commonwealth, they

must be a heavy burden upon the people. Superstition prevails to a considerable degree ; astrology, for example, is much practised.

The language of the Calmucs is derived from the Mongolian, but is intermingled with many Tartar words.

Of the hordes under the Russian sovereignty, that of the Derbets is the strongest, as they have 10,000 kubitkas or families. The number of Calmucs in the Russian Empire, taken collectively, amounts to about 100,000.

The encampments of the hordes are subordinate to chiefs who pay tribute (Taishis) ; and the Vice-Khan, who is chosen by Russia, governs the entire people, consisting of the high-priesthood, the nobility, the inferior priests, and the common people. In some countries, Spain for instance, the nobility are distinguished according to blood, while the Calmucs are classed according to flesh and bones ; the higher priesthood and the nobles (say these people) have white bones, the inferior priests and the common people black bones, and (by a classification somewhat similar) women of rank are provided with white flesh, females of the ordinary classes with black flesh.

The Calmucs possess the senses of sight, hearing, and smelling in great perfection ; those of taste and touch are not so good. Their memory is excellent, and hence they quickly acquire foreign languages. They receive instruction in reading, writing, arithmetic, geography, astronomy, astrology, and medicine, each camp having its schoolmaster (bashka). They are, to be sure, not far advanced in these branches ; and in the medical sciences (chiefly in regard to internal diseases) they are very deficient.

The Calmucs must be pronounced rather short than tall. They are not fleshy, but broad shouldered, have a broad flat face, a small flat nose with large nostrils, narrowly opened eyes, and a short chin, long ears that stand off from the head, and always black hair. As they sit with their lower limbs crossed under them, and ride a great deal, they are bandy-legged. Their habits are extremely uncleanly, and in the choice of food they do not disdain even cattle that have died a natural death, entrails, cats, mice, grass, &c. Bread is rarely eaten by them, but a mixture of ryemeal and salt water is often used. Sour milk, whey, a spirituous liquor manufactured of mares' milk and resembling whiskey, tea, and water are their ordinary drinks. Both sexes are passionately fond of smoking tobacco.

They are, upon the whole, lazy and averse to work. Their principal occupations consist in the rearing of their cattle, in the manufacture of their kubitkas, their household utensils, and their horse trappings. The women are more active, and prepare the furs, the felt, the clothing and boots, the whiskey and cheese ; they also spin the wool of the camel sheep, weave tape, saddle girths, &c.

The herds of the hordes consist of a large number of camels and horses, as well as cows, sheep, and goats.

In their migrations, the kubitkas, utensils, and food of people of rank are loaded upon camels, those of the poorer classes upon horned cattle, and the women and children, on horseback, drive the herds. The horses of men

of distinction are ornamented with small bells of different kinds, and the baggage is covered with carpets or blankets. The lord rides at the head with his people, and after him his steward, carrying a small banner in his hand. The cradles with the infants are placed on both sides of the camel saddles.

The dress of the men consists of an over garment made of cloth or cotton stuff, which reaches to the calves of the legs, and has long sleeves, very wide above and tapering to the hand. In addition to this, there are one or more under garments (of damask with the rich), which fit closely, are fastened at the breast with buttons, and girded with a belt. Over long linen breeches short boots are worn. The poor wear red leather breeches and a fur coat upon the bare body. In winter, men of rank also wear furs. The women wear wide trowsers; their chemise fastens at the throat; their dress is similar to that of the men, only usually lighter and neater, and the upper garment is often without collar and sleeves, has variegated bordering, and is cut open behind. The head of the Calmucs is shaved, with the exception of a small space behind the crown, where they permit the hair to grow, and twist it into one or more queues. The hair of young girls is attended to with care, parted from the crown down, and twisted behind into one large plait, and into several smaller ones at the sides. At their marriage, all these tresses are loosened, and but two large plaits are made of them, which, secured in a covering of black material, hang down over the shoulder. Women wear rings in both ears, girls in but one. Females, also, wear short boots; those of a red color being most esteemed. Yellow, being considered sacred, is never selected. Both men and women wear caps, which are usually round, low, and bordered with fur. In summer, men of rank and the priests wear large, flat, round summer hats. Both women and girls rouge their cheeks.

The house of the Calmucs, called by the Russians "kybitka," by the Calmucs themselves "gærr," consists of a framework of lath, painted red, which may be easily set up and again taken apart, and which is overlaid with felt coverings when in use. The houses are round, with a conical roof, having an opening at top for the egress of smoke. They are a very ingenious invention for a pastoral people; strong, and fit to withstand storms; warm in winter, spacious, and fully secured against snow and rain by means of the covering of white felt which entirely envelopes them. Fuel, in winter, consists for the most part of dried dung of the camel and horned cattle, as the steppes furnish but little wood.

The great number of cattle renders a migratory mode of life on the part of the owners necessary, and in summer these changes of abode are made as often as once in six or seven days; in winter, however, they are not so frequent.

The Kirghis (pl. 15, fig. 14, and pl. 16, figs. 2 and 3, Kirghis in camp). The three great hordes of horsemen living in the territory extending from Lake Aral to the confines of China, and, in part, in the far-spreading districts of the Celestial Empire, are called by the Russians, "Kirghese," "Kirghis-Cossacks," or "Kirghis-Kaisacks:" they, however, call themselves "Burut."

The great and golden horde is now the smallest. Many of their branches are called by the Russians "Wild," or "Stone," or "Black Kirghis." They are braver, more barbarous, more rapacious and revengeful, than the other hordes. Travellers through their territory must either pay a tribute, or dread being attacked, plundered, and perhaps even made slaves. The Middle Horde, which is the most numerous, is said to number about 480,000 persons of the male sex, and extends from Lake Aral to the Upper Irtysh. The Little Horde, dwelling principally between and to the north of the Caspian Sea and Lake Aral, is reported to be nearly as numerous as the one last mentioned.

The Kirghis are, for the most part, tolerably large, the poorer portion being generally slender, the richer, on the contrary, frequently very corpulent. As they but seldom alight from their horses, and when off their backs are squatted upon their felt blankets, they are usually bandy-legged, like the Calmucs. Their features show a mixture of the Calmuc and Tartar characters; in the east, however, approaching more to that of the former, in the west to that of the latter. Almost all have black eyes; most of them also black, seldom brown or reddish hair. The complexion of adults is tanned. Men wear their beards, but shave their heads. Women twist their hair into two plaits, girls into many.

The men wear wide coats of cotton or silk stuff, which supply at the same time the place of shirts. They sometimes put on several, one over the other, and an overcoat of cloth, nankeen, or silk; in winter of fur, and wadded, or lined with soft leather. A broad woollen or silk girdle holds the undercoats together; the overcoat is held by a leather belt, ornamented with plates of copper or brass, from which are suspended a pouch, containing the pipe and various small utensils, and a knife. The wide pantaloons are of various materials, and in riding extraordinarily wide leather over-trowsers are put on, all the coats, with the exception of the overcoat, being thrust into them. The boots are made of black, green, or red leather, with toes bent upwards and very high heels. The covering for the head consists of a tapering cap, with flaps capable of being turned up or down. In the eastern districts it is much lower than in the western. The long wide frocks of the women are left open to the girdle. Women, however, wear trowsers and boots like the men.

The habitations are tents of felt, as with the Calmucs; and thirty to fifty, or more, constitute an "Aul," or village.

Rearing cattle, hunting, and plundering excursions, constitute the principal employment of the Kirghis; but they also trade in skins, furs, wool, felt, &c. A bartering commerce exists between the eastern Kirghis and the Chinese; the former giving their goods in exchange for silk stuffs, tobacco, tobacco pipes, a small quantity of silver, tea, and lacquered wooden wares, &c.

The Bashkirs (*pl. 16, fig. 1*) inhabit the southern Ural; many have fixed their abode in the villages of the southern circles of the provinces of Wiatka and Perm. These latter are peaceable, very plain both in their dwellings and their manner of living, and are distinguished for their

cleanliness. Their originally Finnish stock is strongly intermixed with Turkish, Mongolian, and Russian blood, and the Turkish language has become their idiom. The Bashkirs of the province of Orenburg are warlike, rapacious, and rude in their manners. They rear cattle and bees, and are hunters and agriculturists, their herds being, however, their principal means of support. They raise little grain, and eat but little bread. Instead of paying tribute, they render Cossack service to the Russian government, and are usually added in small numbers to the Cossack regiments. They are mostly wealthy, and many of them very rich in cattle. Their limbs are strong, their hair never fair, their eyes always small.

The Turkomans (pl. 10, fig. 23) are the Turkish tribes that rove about with their herds in a portion of Northern Persia, west of the Caspian Sea, in Armenia, Southern Georgia, Shirwan, and Daghestan, and constitute the principal part of the population of these countries. It is difficult to determine their origin. They are Turkish tribes which, in the twelfth and thirteenth centuries, came over the Dshihun, or Oxus, to Khorasan, and from that place spread over Northern Persia, and, more westwardly, over Syria and Asia Minor; although they themselves contend that the source from which they are derived is at the north-eastern end of the Caspian Sea. The Persian word "Turkman" is said to signify "Turk-like," as the Persians hold that the Turcomans are descended of those Turks who in Khorasan had married women of that place. As, however, the portion of the nation which did not come to Persia, and remained behind on the Dshihun, also call themselves by that name, the Persian explanation cannot be very correct. According to Burns, "Turkumân" signifies "a wanderer," and "Turk-man" "I am a Turk." The Turkomans of the desert of Khiva are usually denominated "Truchmenes" by the Russians, and are at present chiefly under the government of the Usbeck Khans of Khiva, Khokan, and Bucharia, or, according to their own version of the thing, their allies and guests. The tribe most worthy of note is the race of Salyr, and after it that of Ata, who assert that they are descended directly from the Caliph Osman. The Turcomans have neither the firmness of character nor the love of justice that so greatly distinguish the Caucasian nations. "They are," says Murawiew, "a nation of beggars, who, in spite of their nomadic habits, have no idea of hospitality; having no desire but for money, they will lend themselves to any baseness for lucre. Obedience is, as it were, a word unknown to them: they will, however, yield obedience to any one among themselves who proves himself more cunning and more enterprising than the rest, without questioning his authority. They are perfectly harmless to travellers, even though they be unprotected or unarmed. They will even bear with a great deal, showing a complete indifference to harsh language and even to blows. Ideas such as the state and its welfare, personal or public disgrace, and the like, are entirely beyond their comprehension." They are an equestrian nation, and of the Mohammedan religion, following the doctrines of Omar.

The North and East Siberian inhabitants of Russia comprise the

Tchouktches, Koriaks, Kamschatkians, Aleutes, Yakoutes, Tungouses, Burates, Ostiaks, and Samoyedes.

The Tchouktches, inhabitants of the extreme north-eastern portion of Asia, belong to the Mongolian race, and are related to the Koriaks, who live southwardly from the peninsula of the Tchouktches, in the north of the peninsula of Kamschatka. Some of them are nomadic, others have fixed places of abode; and although subjects of Russia, they have preserved a considerable degree of liberty. They have stout frames, and are of medium size. Their head is small, with a dusky brown, spare, round face. Their hair is black, and is worn short by the men, whilst the women twist theirs into two pendant braids. The women tattoo two black semicircles upon each cheek, which are connected by a cross-line. The warriors, who are estimated at 4000 to 5000, ornament their arms and legs with various figures. Their dress consists of long coats of skins, doe-skin breeches, and long or short boots. The women wear wide jackets, to which the trowsers are sewed. Both these articles, as well as the boots, are made of doeskin. Their finery consists of necklaces and ear-drops of beads, and brass or iron rings. Flesh, fish, and train oil, with berries in summer, are almost their only food, bread being very expensive. The nomads have herds of reindeer, sometimes consisting of from 1000 to 10,000 head; those having fixed places of abode are engaged in hunting and fishing. The sleighs are drawn by dogs; and for navigation they use boats made of driftwood, whalebone, and morse-skin. These boats are called "baiders," and are prevented from upsetting by means of bladders, filled with air, fastened to the sides. Summer residences consist of a frame of slender poles or bones, covered with the skins of animals; for winter habitations, however, whale ribs are employed as beams, and are covered with grass and earth in such a manner as to give to the huts, when seen from a distance, the appearance of mounds.

The Kamschatkians live to the south of the Koriaks, in a large, inhospitable territory. In the interior, however, there are valleys favorable to vegetation, and producing even trees that furnish timber for shipbuilding. The number of the Kamschatkians is said not to exceed 6000. They have adopted the Russian customs and ceremonies, and even their disposition is essentially Russian. The dress and dwellings also are similar to those of the Russians. They belong to the Mongolian race, are short, have large heads with a flat broad face, and small sunken eyes, that are frequently inflamed by the dazzling snow. The lips are thin, and the scanty hair is black. The females are well formed, and highly respected by the men. Hunting and fishing are the chief employments of this people, who from laziness shun cattle-breeding and agriculture as being too laborious.

The inhabitants of the Aleutian Islands, about 3000 in number, live in large caverns, are good natured, wear bones adorned with beads in the perforated ears, nose, and lips, and support themselves by hunting and fishing.

The Yakoutes are found on both sides of the Lower Lena. The wealthier among them dress in reindeer skins, the poor in horsehides. When going abroad they attach to their girdle a knife fastened to a long

stick, and carry with them steel, flint, and tinder prepared from the wormwood plant. The short-stemmed pipe is placed in the hinder part of the boot. Tobacco smoking has with them become a matter of prime necessity; they usually swallow the smoke, and often continue the enjoyment till they fall down senseless. The summer "yourtes" (habitations) are conically shaped, constructed of long poles, and covered on the outside with birch bark. The winter yourtes are quadrilateral. In constructing the latter, three parallel rows of posts are first driven into the ground, the middle row being somewhat higher than the two others. Each row is topped by a beam connecting the several posts; and at each end the higher middle row is connected by a cross beam with both of the lower rows. This framework is then covered with boards reaching from the highest row to the lower ones, the side walls being likewise made of the same materials. The whole, however, is then covered with weeds, earth, and dung. In the centre, over the fire which is kindled upon the bare ground, a kind of chimney is constructed. Broad benches separated by partitions, so as to serve also for beds, are fixed to the walls around the inside of the yourte. The cattle are kept in an adjoining building having its entrance in the yourte.

The Yakoutes are of medium size, but robust form; the face is somewhat broad and meagre, and of a light copper color; the eyes are small, the hair weak in growth and worn short. They are fond of eating, and consume a great deal of food; but are regardless of its nature, whether the flesh of reindeer, horses, rats, or mice, or whether it is fresh or putrid. They eat blood and fat formed into a pulpy mass, and pour down their throats tea and broth hot enough to scald the lips of a European. The Yakoutes are very hospitable. They are engaged chiefly in rearing cattle.

The *Tungouses*, between the Lena and the Yenesei, are of Mongolian extraction. They are divided into Forest and Prairie Tungouses. According to their occupations, however, they are further divided into fishermen, reindeer, horse, and dog owners. They are of medium size, have broad faces, small sparkling eyes, and long black hair, which they shave off, leaving only a long tuft at the crown. The complexion of older persons is yellowish, that of younger persons whiter. The dress is mostly made of leather or furs. The Tungouses congregate in tribes, some of which are considered of more consequence than others. The tribes elect their own sovereign, who is confirmed afterwards by the government. Only a few of them are Christians; the greater portion worship the sun and fire. Their disposition is gay and frank, and they are very hospitable. Their senses of hearing and sight are exquisitely refined.

The *Burates*, denominated *Bratski* in Russia, are of Mongolian lineage, are weak bodied, and almost always look unhealthy, probably on account of their great uncleanness. Their occupations are the rearing of cattle, fishing, and hunting. The greater part of them are adherents of Buddhism.

The *Ostiaks* inhabit a large portion of Western Siberia, and the origin of those in the neighborhood of the Obi river is the same as that of the

Finns. They are small and weak, have broad, inexpressive countenances, yellow hair passing into reddish, and thin legs; they are timid, good-natured, and very honest. Both sexes dress in furs.

The Samoyedes (*pl. 1, fig. 12*) live in North-western Asia and North-eastern Europe, and are mostly very small in stature. Their head is comparatively large, the face flat, mouth wide, eyes long and narrow, and ears very large; complexion of a brownish yellow color, and glistening with grease; hair black and bristly. The dress consists of furs. The hardest work falls to the lot of the women. Rearing live stock, especially reindeer, is the principal occupation of the Samoyedes. They worship a number of gods, and the sun and moon are adored as inferior deities.

The Inhabitants of the Turkish Empire.

The Turkish Empire comprehends provinces in Europe, Asia, and Africa. European Turkey has an area of 144,000 square miles, and the population is estimated at about 1,700,000 Turks or Osmanlis. The remaining inhabitants are very numerous, consisting of Greeks, Slavonians, Wallachians, Arnauts, Jews, Armenians, Gipsies, &c. Asiatic Turkey, with an area of 337,000 square miles, is inhabited, besides Turks or Osmanlis, by Greeks, Armenians, Lasi, Georgians, Arabs, Jews, Turkomans, Kurds, Nosairs, Druses, Maronites, and Gipsies.

Mohammedanism is the established religion; other religious denominations (*rayas*) are tolerated, but obliged to pay a capitation tax (*karatch*). The Turkish Empire is an absolute monarchy, and the Grand Sultan Padishah possesses the highest temporal and spiritual power. The throne is hereditary in the male line alone. The imperial court is denominated the Sublime Porte. The governors of provinces are called "beglerbegs," "pashas of two or three horse-tails," and "sandshaks;" the government of some districts being, however, committed to "voivodes" and "agas," who are entirely independent of the first named functionaries. The divan is the Sultan's cabinet council. The minister of public worship and instruction is called Grand Mufti; the prime minister of state and war, Grand Vizier; and the minister of foreign affairs, Reis-Effendi. The Grand Mufti and the higher priesthood, who are also learned in law, constitute the corps of the Ulema, and form a part of the divan.

The Turks call themselves *Osmanlis*, since the name Turk signifies a rude man. The Ottomans are descended not from one people, but from many. When their progenitors under Osman founded the Ottoman Empire in Asia Minor, the conquerors intermixed with the vanquished nations, who had embraced Islamism. In the south-eastern portion of European Turkey alone, do they constitute the majority of the inhabitants. Of true Tartar descent, they have not yet stripped off all traces of Tartar manners. Though wanting in taste, they can claim credit both for intelligence and heart; and though rude and unpolished, indolent and covetous, they are, on the other hand, temperate, plain, and friendly. For a long time accus-

tomed to look upon themselves as lords of the country and superior beings, they have, as might be expected, assumed a somewhat imperious manner, which has not as yet left them. There are a few Turkomans in European Turkey, allied to the Osmanlis in language, faith, and customs. Attempts have been made to render the inhabitants of Turkey in Europe more like the people of other parts of that continent; the entire constitution has experienced many alterations, but things remain, notwithstanding, very much as they were in ancient times. Thus, even at this day, each house contains a woman's apartment (Harem), carefully separated from the reception room of the men (Selamlik). The court of the Sultan is also strictly divided into the departments of the Serai (Seraglio), *i. e.* of the exterior, and that of the Harem, *i. e.* of the interior. The ministries of the Interior and of Foreign Affairs, and the Executive, have their offices at the entrance of the Sublime Porte. Next after these buildings, the treasury, with its different divisions, is located, in which are kept the jewels belonging to the house, the gold and silver. Further in the interior is found the hearth, held sacred by the Ottomans, as the emblem of the warlike power of the empire, and of hospitality and domesticity. The places of honor, "shadars" (sofas), belong to the Ulema, a body composed of persons enjoying the highest dignities, sacerdotal and juridical. Hence the highest offices are collectively called Shadars. To the exterior part of the Sultan's court belong the seven apartments; the innermost, the treasury, the provision room, the linen room, the great and small chambers, and the Seraglio of Galata, where pages are educated for the Seraglio. The kitchen and stable, gardens and hunting grounds, hospital, exchequer, and the guard of the Seraglio, belong also to this part of the establishment.

The dignity of Sultan frequently, but not always, passes to the first-born son. The Empress Mother exerts a great influence at the court of her son.

The Grand Vizier manages all the affairs of the Empire, and at the same time is keeper of the great seal, the sultan possessing a duplicate. All commands issued by the Grand Vizier are looked upon as if they came from the Sultan himself. Divans are held in his palace five times in the week, but he can at any time command access to the Sultan for the purpose of reporting to or conferring with him. Next below him are the ministers. The interpreters, through whom business with foreign ambassadors is transacted, are called *dragomans*. To the Ulema, mentioned above, belong also the Cadis, or judges; the Muftis, or men learned in the laws, who are called upon for advice; the Imaums, or ministers of religion; and the Dervises, or monks. The churches (Mosques) are divided into great or Dshami, and small or Medshed.

The Turks are lovers of the table. Pilau, that is to say, fowls or mutton with rice and spices, is a national dish. Roast meat, with the exception of pork, is frequently eaten. Few vegetables are eaten; but pastry, and especially preserved fruits, are much liked by the Turks. Their principal drink is coffee, which is taken while they are smoking tobacco, both sexes indulging in this latter practice. As food is prohibited in the day-time during the fast of Ramazan, the pleasures of the table are enjoyed the more

at night. The Turk understands how to associate in his life the enjoyment of repose with everything gratifying to the senses. He is not fond of such recreations as walking and dancing, and he is not very sociable. His ignorance is a bar to rational conversation. When visits are paid, men never meet any but persons of their own sex, women not being permitted to appear in male society. Even among the lower classes they never go abroad unless veiled, the eyes alone being visible. The place in which the women reside (harem, that is to say, prohibited spot) is always separated from the portion of the house inhabited by men. Women only meet in their carefully inclosed baths, or in the interior of the harem, where their feasts also take place. At such assemblages they partake of sherbets, confectionery, &c., exhibit and admire dresses and jewelry, and converse about the male sex and female neighbors. Female dancers, who perform the most voluptuous pieces before them, are allowed to enter: a respectable woman never dances herself. They are forbidden also to take part in the public prayers at the mosques. Although confined in this manner, the women are very adroit in contriving intrigues against their husbands, and for such purposes chiefly make use of milliners, who are usually Jewesses or Armenian females.

Rope dancing, Chinese magic lanterns, public dances, and ill-performed masquerades in the open fields, are the principal amusements of the Turks. They have no particular taste for the drama and music. Games of chance are strictly prohibited.

Turkish artists and artisans are divided into guilds. Among the craftsmen, the workers in leather are distinguished above the rest for their beautiful work; they furnish excellent saddles and harness. The Turkish painter produces only landscapes, flowers, birds, &c., and arabesques; the Koran forbidding him to paint the human form. The sculptor executes tombstones, but seldom any other work; and the engraver cuts seals and passages from the Koran. The physicians entertain many superstitions and prejudices, and hence Franks (Christians) are preferred as medical attendants. Commerce is in the hands of Greeks, Armenians, and foreign commercial houses; the banking and exchanging business is managed by Armenians and Jews. There are but few Turkish farmers, and they never raise a greater quantity of produce than is necessary for the subsistence of their families and the payment of their trifling imposts.

The dress of the Turks consists of long wide trowsers and a long full garment, under which a handsomely trimmed vest is worn. When out of doors, they wear fancy-colored leather slippers, which are put off before entering a mosque or a room. Boots are made use of only for riding. The head is shaved and covered with a turban. The beard is worn full, and is carefully trimmed. The military have at present the tight-fitting European dress. The men attach great value to costly pipes ornamented with gold and precious stones; gorgeous and expensive riding equipments are equally esteemed.

Females color the edges of the eyelids with a fine black powder (*Surmeh*), and the nails, brown, dark, yellow or red. They wear a long, wide mantle

of taffeta or satin, having very wide sleeves that reach to the elbows, with or without fur trimming, according to the season of the year. The under gown is of thinner silk, or gold and silver brocade; likewise long, open at the bosom, and with sleeves that reach to the hand. A girdle of leather, satin, or embroidered velvet, sometimes a Cashmere shawl, is loosely tied around the waist. The girdle is usually the most costly part of the dress. Wide silk trousers reach to the ankles; precious stones and pearls are necessary requisites of ladies' dress; rich armlets and necklaces are also frequently worn. Persons of less wealth wear sequins, or other gold coins, around the neck.

Pl. 1, fig. 3, Turk in the ancient national dress. *Pl. 13, fig. 1, a*, Turban of the inhabitants of Lebanon; *b*, Turban of Armenian merchants at Damascus; *c*, Turban of the people in the district of Smyrna; *e*, of the Bethlehemites; *f*, of the people of Syria generally; *g*, Kaffieh of the people of Beyrout; *h*, Travelling turban; *i*, Head-dress for rainy weather; *q*, Turkish fez; *s*, Dervise's cap. *Fig. 2*, Syrian Sheikh and his wife; *fig. 3*, ancient female dress of the Smyrniotes; *fig. 4*, modern female dress of the Levant; *fig. 5*, dress of the Maronites; *figs. 6—8*, Maronite women; *fig. 9*, dress of girls of Nablous; *fig. 10*, costume of the Nazarenes; *fig. 16*, Armenian merchant; *fig. 17*, Armenian girl; *fig. 18*, Turk of Mardin. *Pl. 14, fig. 1*, Turkish public bath for females; *fig. 2*, the interior of a Turkish woman's apartment; *fig. 3*, the *Iftar*, meal of the Grand Vizier with the other ministers of the Porte, on the third night of the Ramazan. *Fig. 4*, ceremonies in the presence chamber, on the day before the festival of Beiram. There are, properly speaking, two *Beirams*, the only religious festivals of the Mohammedans. The first, *Id-fitr*, *i. e.* breaking of the fast, comes immediately after the fast of Ramazan, and is called *Beiram Kutshuck*, or *Kitschi-Beiram*, that is, the little Beiram. As it closes the fast, and is celebrated with great manifestations of joy, it is called the Easter of the Turks, and considered their greatest festival. The second, *Id-Adha*, or *Kurbaan-Beiram*, that is to say, festival of the sacrifice, is celebrated seventy days afterwards: it is said to be a celebration of the offering of Ishmael (Isaac). As the Mohammedans calculate time by lunar years, these festivals run through all seasons in a period of thirty-three years. The first festival continues properly but one day, but it is kept up by the people for three days; the second, four days. These two festivals are the only true holidays of the nation, and are celebrated with the greatest pomp. At an early hour the Sultan receives the congratulations of the principal officers of state in solemn audience (*pl. 14, fig. 4*), and then goes with great parade to the mosque. After devotions, the officers of state are feasted, sixteen of them presented with sable furs, and then the changes in the government are determined upon.

Pl. 14, fig. 5, represents a religious dance of Turkish dervises, which consists of a continual whirling in a circle, causing a great puffing out of the wide dress. *Fig. 6*, prayer and ablution of Mohammedans, prescribed by the Koran, which ordains the fast of Ramazan, the distribution of alms, works of charity, the performance of at least one pilgrimage to Mecca, prayers offered at least five times a day, and the outward cleansing of the

body, which is the object of the figure referred to. *Fig. 7*, a dervise doing penance ; with a rosary on which are ninety-nine coral beads.

The Greeks.

The Kingdom of Greece extends in a southerly direction from the mouth of the Aspro and the Gulf of Zeitoun ; projects into the Ionian and the Ægean Seas, with numerous and deep indentations and many high promontories and jagged peninsulas ; is surrounded by a scattered group of islands of a semi-volcanic character ; and divided by the deeply cutting Gulf of Lepanto into two grand divisions, Livadia and the Morea. Since the 7th of May, 1832, after bloody struggles with the Turks, it has formed an independent kingdom. The inhabitants are Greeks and Albanians, and of foreigners chiefly French and Germans. "The Greek," says G. Brückner, "whose ancient classic beauty has been somewhat defaced by intermixture with Slavonians and Albanians, but who notwithstanding possesses a vigorous, well-moulded, characteristic figure, is more frivolous than the Spaniard, resembling him, however, in temperament, as well as in frugality and fondness for independence, in heroic endurance, in spirit and wit, and in perfidiousness and his fondness for civil disputes. His education, like his civilization, has, until the present time, been of no high character, as the inhabitants of the coast were corrupted whilst the mountaineers and the warlike Mainotes of the Morea were still rude." The nation adhere to the Greek religion, and now have their own independent spiritual government. The modern Greek language is called the *Romaica* or *Aplo-Hellenic*, and the nation still denominate themselves Romai (Romans) from the Roman Empire of the East. The universal higher dialect, *i. e.* the more improved language of letters and the churches, and that used in conversation by educated persons, particularly in Constantinople, differs less from the classic Greek than the numerous vulgar dialects, as, for example, the modern Volo Doric, the Zagoran (a remnant of the Doric), the Cretan or Candiote, and the Epiroan. In Constantinople, in the vicinity of Mount Athos, and on the Islands of Paros and Nicaria, the purest language is spoken ; in Cyprus, it has still retained a great deal of the ancient Greek, but is very much deteriorated ; in Corfu, the Greek has been pushed into the interior of the country by the Venetian dialect ; and the Mainotes in what was formerly Sparta, from whom a colony in Corsica is descended, speak a miserable and corrupt Greek. The dress of the men (*pl. 1, fig. 2*) bears much resemblance to the Turkish costume ; they have, however, mostly laid aside the turban, and adopted the fur cap or the fez in its stead ; the soldiers, especially, wearing the latter (*pl. 13, fig. 1'*), a cap of red felt with a large blue tassel.

Rouging, and coloring the eyebrows black, is yet a universal practice among the women. They display bad taste in their attire, overload themselves with finery, and at the same time attach but little importance to neatness or symmetrical disposition of their dress. Females, even now,

live as they did in the ages of antiquity, separated from the male sex ; and every Greek lady of rank is confined to her women's apartment. Baths, here as among the Turks, are the resorts where women meet. In parts of the country, however, where the Greeks have had more intercourse with the rest of the people of Europe, for instance upon the islands and in the large towns, the manner of living has already experienced a great change, and women take part in social intercourse.

Fertile as is the soil of Greece, agriculture is yet pursued in a very slovenly manner, and the implements of husbandry are still very inferior. The Greeks, however, cultivate olive trees and rear silkworms, and the country derives great advantage from these sources. The vine thrives very well in Greece, where the finest sorts are grown ; and in the Morea currants also. Much is now done for the cultivation of the intellect, although the Greek clergy strive to prevent enlightenment of the masses. Since the year 1837 Athens has possessed a university.

The Italians.

In general, not much can be said with precision respecting the character of the present inhabitants of Italy, as the country is split up into so many small states with different forms of government ; yet it may be asserted with justice, that they are distinguished in a manner altogether peculiar, by natural vivacity of spirit, great aptitude for poetry, music, and the plastic arts, as well as by a taste for the beautiful in every phase of its development. Want of principle, pusillanimity, deceit, and a vindictive disposition, are too frequently found amongst them. Even their piety is of a sensual nature, and more an affair of habit than of the heart. Strong excitement is requisite to arouse them from their general apathy ; and their emotions, though powerful for a time, are rarely deeply seated. Owing to the great ignorance of the masses, external observation of pious forms is frequently found in connexion with a life deeply stained with vice and crime. The bandit commits murder for a trifle at the order of another ; the robber frequently takes life also, but believes he can atone for everything by means of prayer, fastings, &c. Tuscany and the Lombardo-Venetian Kingdom, nevertheless, form honorable exceptions, and show that where a good government has the control of affairs, and especially where much is done for popular instruction, a people sunk even as low as the Italians, may yet be raised again.

The Italian finds less pleasure in travelling, walking, cheerful company, and hospitality, than in driving through the principal streets, in music, frequenting of public places, gambling, and especially the theatre. The most common public diversions are those of the carnival, nowhere so brilliantly and noisily celebrated as in Italy, principally in Rome, Florence, and Venice. Even priests, monks, and nuns are permitted to take part in the frolic. Almost all the people are masked, every serious employment is laid aside, and the churches and halls of justice remain empty.

National costume is no longer found among the higher classes ; the cloak, however, in which the Italian wraps himself during the day, is the most important part of his dress. Should he possess no such article, he at least hangs his jacket over his shoulder in the manner of a cloak.

The inhabitants of the *Sardinian Monarchy*, who are a mixture composed chiefly of French, Romans, Lombards, may be divided into four principal branches : the Savoyards, Piedmontese, Genoese, and Sardes.

Among the *Piedmontese*, married women, widows, and girls, are sometimes distinguished by their dress, chiefly by the breadth and number of rows of red ribands upon the aprons. The dress of the women of the region of Costa is very neat ; they wear a short, tightly-fitting brown petticoat, with a frill at the breast, and a small hat fastened sideways upon the head. Their hair is tastefully braided, and fastened with combs or silver pins. Older persons wear a linen veil. No attention, however, is paid to cleanliness, particularly by the lower classes. The common *Genoese* still wear the old Genoa cap, a cloth jacket, short breeches, with woollen stockings, and not unfrequently gaiters ; the women attach their veils with address and taste. They cover the head and arms in such a manner, however, that their charms are by this means only placed in a more advantageous light.

The head-dress of the women of the maritime districts of *Genoa*, those for example living in the vicinity of the town of Chiavari, is odd. Their hair is neatly braided, and fastened in a thick roll upon the top of the head. Upon this they place a cloth folded together in a square form, and fasten it firmly by means of a large pin. In unfavorable weather it is unfolded and tied round the head. The country girls secure their braids of hair with five or six large silver hair pins. Women of the vicinity of Nice wear a tight bodice, adorned on holidays with ribands and bouquets of flowers. The petticoat, which is pretty long, and the apron, are without ornament. Girls wear woollen gowns, marriage only conferring the right to wear silk dresses.

The holiday attire of the men consists of a short, tightly-fastened waistcoat, reaching only to the girdle, and a very short coat, having short sleeves with narrow cuffs. Their belt is blue or red. Short breeches and brown or blue woollen stockings, and low shoes, complete the dress. When not in full dress, both sexes wear their hair in a green net.

The inhabitants of the *Island of Sardinia* (Sardes) are a mixture of several nations ; the Italians, however, constitute the majority. They are not tall, but of a vigorous frame ; are gay, courageous, persevering, susceptible of love, but implacable in hatred. Their minds are fine and pliable ; they have a particular talent for poetry ; but little is done for their instruction, and they are still almost mere men of nature. The Sarde is very fond of music, games of chance, skill, or courage, and other recreations. The dress of the common people consists of a woollen jacket, mostly white or scarlet, over which is worn a wide and long smock-frock without sleeves, and made of sheepskins sewed together, resembling a vest ; this is fastened around the waist by a leather belt embroidered with silk,

in which a knife is placed. The breeches are very wide, made of plain wool, and open at the knee. Woollen gaiters, or black sheepskins clothe the feet. A white or black woollen cap covers the head. Women wear a full scarlet or white jacket, a bodice with whalebone, woollen petticoats, and a handkerchief of muslin wound around the head. (*Pl. 9, fig. 2*, threshing-floor of Sardinian farmers; *fig. 3*, marriage celebration of Sardinians.)

The dress of the *Tuscans* is the one common throughout Italy. Coats and boots are seldom seen; only in bad weather a kind of cloak is worn. A black or white straw hat, manufactured by themselves, usually covers the head. Women and girls wear bodices without sleeves, and chemises with short sleeves bound with small red ribands. The petticoat is generally scarlet like the bodice, which is laced both in front and behind; and the small apron is very neat. On week days the hair is worn in a silk net; on holidays, however, it is nicely arranged and ornamented with flowers. A neat little straw or black felt hat, frequently adorned with a nosegay, or feathers, is set almost upon one ear. In cold weather a handkerchief is tied over the hat or net.

The inhabitants of the *States of the Church* are distinguished for a clear understanding, an ardent fancy, and deep, easily excited feelings. Their dress does not differ from the usual costume of the Italians. *Pl. 8, fig. 3*, gives a representation of the illumination of the dome of St. Peter's Church and the fireworks at the Castle of St. Angelo, that take place in Rome on the evening of St. Peter's day.

The principal characteristic traits of the *Neapolitans* are, good nature, laziness, superstition, attachment to all sorts of sensual pleasures, and passions, violent, but soon cooled. The Neapolitan differs in outward appearance from other Italians only in having a browner complexion. The figures of the men are, in general, handsome and vigorous; females, among the lower classes, on the contrary, are ill-favored and grow old prematurely; their great filthiness makes them still uglier. Both sexes frequently wear their singularly long hair in nets; women dye their hair brilliantly black. Females of Mola di Gaeta wear their hair neatly braided, wound about some light substance, and fastened with a large silver pin. The shepherds of Apulia are dressed in sheepskins. The general national dance of the Neapolitans is the Tarantella. The Lazzaroni form a peculiar class among the Neapolitans, gaining their bread as fishermen, fruit and vegetable sellers, porters, &c. They are mostly of tall, vigorous growth, wear linen breeches scarcely covering half the thighs, and sometimes a shirt, though more frequently none. They often sleep under the open sky, with a stone for a pillow. They rarely work, except under the pressure of immediate want. On the one side, the Lazzaroni are good natured and faithful; on the other, however, ready again at any time to commit arson to order, and to rob. They are much to be dreaded in revolutionary times.

The *Sicilians* of the present day are a mixture of various nations. Their bodily form, as a rule, is handsome, strong, and well shaped; complexion olive colored; eyes fiery; features expressive. The women, with the exception, perhaps, of those of Catania, are said to be less good-looking.

The Sicilian is hospitable, detests drunkenness, and is generally temperate in eating and drinking. In his character the most opposite properties are found associated together; for example, good nature and knavery, courage and a cringing disposition, sobriety and a love of pleasure. Patriotism and a thirst for independence are his principal prominent traits. The attire is poor, like the dwellings, with the women often gaudy, and in some districts similar to the Moorish. As little is done for the education of the common people, they are almost without information.

The Spaniards and Portuguese.

The Spanish nation are distinguished for many good qualities; firmness, vivacity of mind, courage, perseverance, temperance, and a sentiment of individual and national honor, combined with piety, are pre-eminently proper to them. The humblest Spaniard does not demean himself, never manifests servility or slavish abjectness; his glance is firm, his bearing frank and upright; his greeting, address, and farewell simple; and he recognises and respects the human being, even in the otherwise despised beggar. If the Spaniards, as a general rule, are less industrious than the Germanic people, they are, of all Romanic or South European people, generally the most industrious. They know nothing of the sweet inaction of the Neapolitans; they are generally active, in the northern provinces particularly industrious; and this holds good of the women also, who are domestic and constantly occupied; idleness, except perhaps in the *tertulias* (evening parties), being esteemed a disgrace amongst them. A very praiseworthy principle, also, of the Spaniard, is that of having as few necessities as possible, and of regulating them according to his means, without even making himself entirely dependent upon the latter. In this way he secures his independence. If, in addition to the above, we take into consideration his vigorous frame and his good health, which enables him to bear with ease the greatest hardships and all changes of climate and weather, it is not surprising that the Spaniard is as good a soldier as man of business. The Spanish women are as handsome as they are lively; they have a glowing imagination, and their love is a fresh, deep, inward feeling, with no affectation or coquetry. They are, in general, very faithful and domestic. Society and custom allow no treachery, not even against the mere lover, and their revenge is certain. Love is almost like a sacrament; dissimulation is foreign to the Spanish disposition, and is never the basis of a love affair.

People of rank in Spain have almost entirely dropped the national costume; even the cloak is worn only in winter, or when they follow an adventure in the evening, when the large hat with brim bent downwards is also sometimes put on. Officers of the court, magistrates, professors and doctors, and the priests, appear in uniform. Only the lower classes, and these principally country people, have retained the national dress. They wear, in general, dark-colored waistcoats; short jackets, often trimmed with fancy colored ribands; a cloak over them; and on the head a net of yarn

or silk, hanging down behind and inclosing the hair, which is often braided into a thick queue. Instead of the Arabian veil formerly customary, the women wear a black or white mantilla, fastened on the head, and reaching down to the sides and over the girdle behind. With ladies of rank, it is of very fine blonde or point lace; among the lower classes, of taffeta, gauze, or light woollen stuffs. Women of the highest as well as the lowest grades of society carry fans, and attach the greatest importance to beautiful shoes. The common people of New Castile wear a cloth or leather doublet, buttoned up and fastened with a strap; and, upon the head, the *mantèra*, i. e. a square cap, with turned up sides and a point in front. In Old Castile, the women have retained the ancient Spanish costume almost entirely. They wear a robe usually brown, and tightly fastened at the neck and wrists, and a belt around the waist. Their braided hair is hanging down behind; upon the head they wear a *mantèra* or a black beaver. The country people of Salamanca (*pl.* 9, *fig.* 1, threshing-floor of the peasants) wear silk bodices with pockets and open sleeves, ornamented with small metal buttons, and fastened with a dark silk sash. Brown cloaks, with bright colored collars, hang in a negligent manner over the right shoulder. Both sexes wear the net (*redézilla*), ornamented with a broad riband; the veil of the women is fastened to the net. The necks and breasts of the women are adorned with necklaces of pearls, or chains of precious metals. The wristbands of the shirts are richly embroidered with colored silk. The less wealthy farmer wears a dark brown doublet, ornamented with small buttons and ribands, cut out in front in such a manner as to show the red breast-cloth. A colored sash encompasses the lower part of the body. The brown cloth breeches do not reach entirely to the knee, and stockings of similar color and material reach up to them. *Pl.* 9, *figs.* 1, 4, and 5, represent various specimens of the Spanish national costume.

The Spanish national dance is the *fandango*, in use from the most ancient times. It consists of systematic convulsive movements hither and thither, of the entire body, expressive of the most different passions. The pair of dancers beat time to it with the *castanets*. The *bolero* (*fig.* 4) is an imitation, but less impassioned. Besides these, there are other dances in use, as, for example, the *guaracca*, the *olle*, and *cachirulo*, the egg and the staff dances.

The greatest popular amusements of the Spaniards are the *bull fights* (*fig.* 5, bull fight in the Grand Arena at Seville). The active persons in the fight are, the *toreros* (bull fighters); the *picadores* (pikemen), who keep the bull in action by pricking him with small pikes, thus raising his rage to madness; the *matadores*, who give the death blow to the furious bull; and the *media-espada* (half-swords), assistants of the *matadores*. Detailed descriptions of these cruel and exciting amusements are to be found in almost every account of travels in Spain. It must be hailed as a token of progress in humanity and civilization generally, that bull fights are becoming less frequent.

The *Portuguese* are not large, but strongly built; have black eyes and

hair, strong beards, and dark complexions. They are sensual, vain, indolent, dissimulating to strangers, irritable and revengeful, proud as a nation, and implacable as a people, in their hatred of the Spaniards. On the other hand, they have the credit of fidelity in friendship, magnanimity, charity, temperance, and courtesy. Music and singing are their favorite amusements; and bull fights, with them also, rank high among the popular festivals.

The higher orders of society dress in the styles of the English and French. Women of the middle classes, however, no matter how great the heat of the weather, wrap themselves in a long cloth cloak with a broad collar, and cover their heads with a muslin cloth. When going to church, they wear a dark silk frock, and a large transparent veil. Here, also, great attention is paid to the covering of the feet, which are generally well formed. The dress of the lower ranks in the country is like that worn in the cities, only of coarser stuff. Men wear waistcoats of light colors, and short jackets over them. Short breeches, shoes, and stockings are worn all over the country. The cloaks are always brown, and furnished with a flat cowl. Many wear the hair in a net; others have high tapering caps, with sides turned up. Such caps are also worn by the female peasants, who, in addition, wear striped veils and nets. Country girls, when riding upon their donkeys to market, wear wide boots, short jackets, with long sleeves, fancy colored little caps cocked up in front, and generally carry a fan. They ornament the neck with strings of pearl and metal buttons.

The inhabitants of France, Belgium, and the Netherlands.

Generally speaking, vivacity, which not unfrequently degenerates into levity and superficiality, characterize the French as a nation. The Frenchman enters with enthusiasm upon the boldest enterprises, but soon carelessly abandons them again, in order to undertake new ones. He devotes himself almost entirely to the passing hour, caring but little for the past and the future. His urbanity, his acuteness of understanding, and his hospitality, are known: he cheerfully relieves the necessities of the poor, and assists the sick in their distress. From time immemorial, on the other hand, he has been justly reproached of a national pride that causes him to look with contempt upon every thing foreign. Of late, however, he has commenced to notice and prize foreign literature, formerly overlooked by him altogether.

The French *peasant* is generally very frugal, and in some districts of Lorraine, subsists almost entirely upon potatoes and curdled milk. He is strongly attached to the customs of his forefathers. In the northern departments alone, where he is greatly influenced by civilization, this attachment to the old is, in a measure, disappearing. The country people of some districts on the river Loire, especially in the part which formed the ancient provinces Berry and Poitou, may be pronounced obtuse in the highest degree, indeed even void of feeling. The inhabitant of Brittany,

in western France, is distinguished for violent passions and stubbornness; whilst the people of Normandy are crafty, selfish, and quarrelsome. The people living upon the banks of the Somme are plain in their habits, but of a very irritable disposition. In the northern end of France, Flemish customs prevail; many persons still have subterranean dwellings. Spirituous liquors, chiefly gin, are largely consumed, and the common people are unsociable in their habits. In the department of the Marne, and in the region of the Upper Seine, in what was formerly Champagne, the manners of the inhabitants are very plain. German blood flows in the veins of the mountaineers of Vosges; they are candid, open-hearted, and hospitable, but also phlegmatic. The inhabitants of the Jura are temperate and frugal, and free from violent passions. In the districts of the Rhone, Dordogne, the Garonne, and the Adour, the people are, in general, of very lively temper, and fond of an impassioned, figurative style of language. In Provence, these traits are associated with manners neither refined nor amiable, whilst in Languedoc directly the reverse is the case. In Guyenne and Gascony, the natural disposition of the inhabitants is not always frank. In the mountains of Auvergne and Limousin, the exterior of a portion of the population corresponds altogether with the miserable soil cultivated by them, but they are good natured and candid, charitable and hospitable. Many are compelled by poverty to leave their homes, in order, like the emigrants of Dauphiny, to seek their bread in the cities, as peddlers, porters, water carriers, &c.

The dress, in a few districts of France, has a character altogether peculiar; in general, however, it is miserable and wanting in taste. In many parts of the country, the people themselves manufacture almost all the materials for their clothes. In the marshy regions of the heaths, the inhabitants go upon stilts.

The French have no well defined national costume; the dress of citizens and peasants differs in many points, according to the various provinces in which they are found. Upon the whole, the dress of the peasant is poor, and lacks taste. The blouse (linen or cotton smock-frock) is much in use among them, as well as among the lower ranks in cities. Wooden shoes are very common. The social pleasures of the French consist of music, dancing, the theatre, a variety of games, &c. As a rule, the French dance well and with ease, and this amusement is mingled with all their merry-makings. Great luxury is manifested in the balls, and especially at the masked balls; particularly those that take place in the principal cities, and above all at Paris. In summer, inhabitants of the large towns give dancing entertainments in the country, and the promenades in the cities are frequently visited in favorable weather. (*Pl.* 6, *fig.* 3, a great masked ball at Paris; *pl.* 7, *fig.* 1, promenade in that city; and *pl.* 8, *fig.* 2, a rural ball.)

To the popular amusements, belongs, among others, the naumachy (*pl.* 8, *fig.* 1), a kind of tournament performed in boats, during which the combatants stand at the extreme end of their long narrow vessels, and endeavor to push each other into the water with long lances with knobs at top.

The French are a mixture of the ancient Celts, Romans, and Germans, and their general traits are those of the inhabitants of the South of Europe; they form the connecting link between the people of the south and those of the north. The Bretons in the Armorican peninsula, the Basques and Gascons at the foot of the Pyrenees, the Germans in Alsace, and the Walloons near Belgium are, however, of other stocks. The French are somewhat smaller, but generally more active than the Germans, and usually well formed. Their language, derived from the Latin mixed with German and Celtic words, is simple and expressive. It has two dialects: that of the south (*langue d'Oc*), with a predominance of the Romanic element; and that of the north (*langue d'Oïl*), with a greater number of Germanic elements. French is the language of conversation and of the courts of all the enlightened nations of Europe. It is, however, inferior to the German in structure and copiousness.

The Belgians, of Germano-Celtic origin, are Flemings and Walloons: the former, in the north, related to the Dutch; the latter, in the south, of the same race with the French and Spaniards. Traces of the two latter nations, although moderated by the rough climate of Belgium, are nevertheless still to be discerned in the easy elevation of their spirit, and the unconstrained movements of their bodies. The higher classes speak French or Flemish (a Dutch dialect); the people of the south-east speak the Walloon language (a mixture of French and Spanish); and in the north Flemish is spoken. The common national dress in Belgium is the blouse. The higher ranks follow the French fashions. The attire of the country girls of Flanders is very neat. (The principal city of East Flanders is Ghent, and of West Flanders, Bruges.) The dress consists of a short, tight petticoat, a pretty bodice with a stomacher, and a head-dress not unlike a helmet descending behind the ears and encompassing the neck in a kind of lace collar. Over the latter article they wear a black veil or rain cloth, which the girls arrange in a neat manner.

The Dutch are the offspring of the ancient Batavians, to whom, upon the whole, they still bear a resemblance. They are robust, vigorous, have broad shoulders and hips, but are rather fat than muscular. Their eyes, mostly blue or grey, have usually a cold, steady stare, from under the heavy brows. The women fade more quickly than the men, who generally retain their fresh healthy complexion to an advanced age. Rectitude, candor, honesty, constancy, patience, equanimity, temperance, cleanliness carried almost to excess, plainness in their manner of living, fidelity to their word, are particularly prominent attributes of the Dutch; they are reproached, however, with avarice, greediness of gain, and inquisitiveness. Their confidence in their own powers, which has often the appearance of cold indifference, their imperturbability, and their circumspectness in answering and in judging, have brought upon them the reputation of sluggishness; although no one can deny that they possess industry, courage, and contempt of every danger, particularly in undertakings considered likely to result in profit to themselves. Their costume is plain. People of consequence dress in the English and French styles,

the lower classes in cloth of a dark color ; and old persons sometimes still wear the costume of their ancestors, that is to say, a triangular hat, black coat, large silver buckles to the breeches, and broad buckles on the shoes. Peasants on the coast as well as in the interior generally wear a triangular or round hat, a long wide overcoat of dark color, breeches with two large buttons at the flap, three to four breast-pieces, one over the other, adorned with silver buttons, and large shoe-buckles. The dress of females is not the same in the different provinces ; the principal parts of it, however, are almost everywhere a small cambric cap, usually fastened on both sides with a round brass (also gilt) plate, stiff stays, several handkerchiefs one over the other, a jacket, two rolls on the hips on which rest a number of heavy petticoats, and hanging pouch at the side. A straw hat lined with silk frequently covers the lace cap.

THE NATIONS OF ASIA.

Asia, beyond doubt the cradle and first seat of mankind, differs quite as much in its climate, soil, and products, as do its inhabitants in color, physiognomy, stature, mode of life, civilization, &c. The most thickly inhabited section is the Chinese, a well watered country in the south-east ; the most sparsely settled is Siberia. The elevated table-lands exhibit inhabitants distinguished above the others for vigor ; the river countries, especially the rich, luxurious, southern districts of Asia, on the contrary, possess the feeblest, most effeminate occupants. Asia is estimated to have, in an area of fifteen millions of square miles, a population of upwards of 500 millions. The greater portion of the inhabitants of Asia can be associated into two groups, namely, the Caucasian, and the Old-Asiatic or Mongolian. The former extends from the west as far as the Obi, Belour, and Burrampooter (Bramaputra) rivers, and besides many small hordes, comprehends four principal stocks : the Arabs, Persians (Armenians), Turkish nations (Tartars), and Hindoos. The latter, on the other hand, includes the nations of the elevated table-land and eastern part of Asia, subdivided into the six following principal stocks : Mongols, Bucharians, Mandchoos, Japanese, Chinese, and Further-Indians. To these great families intermixed in many different ways, must still be added, as true families, those of the north-east of Siberia, viz. the Samoyedes, the Yenesei stock, the Yukaghires, Kam-schatkians, Kuriles, and Tschoudes ; and in the south-east, the Malays of Malacca, the neighboring islands, and Formosa, and the Papuas on some of the Indian Islands, and the Moluccas. In the south and south-west, dialects of the Sanscrit (Hindustanee), or Median (Persian), or Semitic (Syrian, Arabian), are spoken ; from the Black Sea to the Japanese islands, Tartar (Turkish, Mongolian) and Thibetan languages prevail ; in the south-east, the Chinese and Birman. Islamism is the most widely extended of all the religions of Asia (in Western Asia, and in part of Northern and Southern Asia). Buddhism, however, has a greater number of adherents ; these are to be found in the elevated country and

eastern part of the continent. *Brahminism* extends over India, and the religions of *Confucius* and *Sintoo* over South-eastern Asia. The followers of all these creeds have always, with more or less malignity, opposed the Christians and Jews; at one time entirely crushing, at another at least checking them.

A great portion of Asia is under European dominion; the whole of Northern Asia belonging to Russia, and a part of Western Asia to Turkey. We have already referred to the inhabitants of these two sections in the descriptions of the two European nations to whom they belong. The British rule over Hindostan and a few islands; and the Dutch, Portuguese, Spaniards, French, and Danes, have scattered possessions in Asia also. The remaining countries are partly states with despotic governments, partly inhabited by nomadic tribes possessing a patriarchal form of government.

The Kurds.

The Kurds inhabit Kurdistan (land of the Kurds) and several provinces of Western and Northern Persia. Some live also scattered in Mesopotamia, Syria, and the eastern districts of Asia Minor. Their language, which is related to the Persian, is intermixed with many Semitic words, which they have received from the Syrians and Chaldeans. The nation is divided into two classes, having different manners of living and different customs. One of these is denominated *Guran*, in Persian *Rajah*, in Turkish *Konylu*, consists of agriculturists, and forms the subordinate class. The second is that of the *Assireta* or *Sipah*, and constitutes the class of warriors. The latter seldom or never cultivate the soil, whilst the *Guran* are never soldiers. The *Sipah* consider the *Guran* as created for their special benefit. The dialects of the two differ also. The *Sipah* are divided into many tribes; few of which, however, have fixed residences, being wanderers who pitch camps according to the wants of their herds.

The Kurds are a vigorous, warlike, but also barbarous, and even cruel set of robbers, who belong to the orthodox Mahomedan church, and for that reason are sworn religious enemies of the Persians. Some of them constitute a separate sect, called *Jesides*, but designated by orthodox Mahomedans as *worshippers of the devil*. The Kurds live in a state of almost constant warfare with their neighbors, are the most resolute and daring nomads of Western Asia, are continually on horseback, and are considered accomplished riders. A sabre, a pair of pistols, frequently a gun, or a long carbine also, are their weapons; and their horses are small, spare, but of extraordinary speed and endurance. The Kurds keep together in bands, consisting of from twelve to twenty horsemen, espy the routes taken by caravans, attack the stragglers or even the main body of the caravan itself if it does not appear too strong for them, and massacre indiscriminately, in contradistinction from Arabian and Turkoman robbers, who do not murder travellers that fall into their hands. Danger can only be escaped by winning the favor of the chiefs in paying them a heavy

tribute. Their dress is sometimes the Turkish including the turban, sometimes consists of a long brown coat worn over wide trowsers, with a red handkerchief around the waist, and upon the head a pointed red cap, which hangs down in ends at the sides. Many also wear the Persian dress. The women wear turban-like caps, with a veil attached behind, and long petticoats with long ribands around the waist, the ends hanging down behind. (*Pl. 15, fig. 13, pl. 16, fig. 7, Kurds; fig. 8, dance of Kurdish women.*)

The Persians.

The Persians are divided into nomads and such as have permanent residences. The majority live in cities and villages; poor people in miserable mud hovels, persons in good circumstances in brick houses, the rich in palaces generally encircled by gardens and having apartments ornamented and cooled by fountains. The present inhabitants of Persia are the descendants of various nations that successively occupied the country. The *Tadshiks* constitute the principal mass of the people, and are at the same time the aborigines. They are of medium size and well grown, slender, but strongly built and muscular. The face is regular, the nose arched, the mouth small; the hair and beard, which are carefully nourished, are black. The hair on the hind part of the head, a hand's-breadth from the forehead and downwards, is shaved off, but the remainder is worn pretty long. In their dress dark colors are preferred. Their long, wide trowsers are of silk or cotton, the shirt mostly of silk, the tight waistcoat of cotton stuff; the coat long, and girded around with a broad shawl. People of rank wear an overcoat trimmed with costly furs. The poor wear jackets with the trowsers, and in winter sheepskin coats. All classes use sheepskin caps about a foot in height, which the rich and distinguished gird around with shawls. Boots are worn only for riding; at other times shoes and slippers, usually yellow or red, with men of rank green, cover the feet. Although their religion enjoins frequent bathing, they are nevertheless no friends of cleanliness, and their clothes are seldom changed. The dress of the female sex is plain but rich. Their trowsers are very wide, made of thick velvet, and come down to the heels. Over these they wear a chemise of silk, muslin, or gauze, which is open to the middle of the body, and fastened by a wide and richly ornamented girdle. In winter they wrap themselves besides in a shawl. Slipper-like shoes clothe the feet. When going abroad they envelope themselves in a veil or mantle reaching to the feet, but having a fine net in front of the face, or two holes for the eyes. They ornament the ends of their hair braids with flowers, pearls, &c. The frontlets, diadems, and hoods, worn by the women, are of many different shapes, and more or less costly. The common head-dress, however, is simply a shawl, hanging loosely down in front and behind. Girls are instructed in the schools, in reading, writing, and embroidery, until their age, according to the customs of this part of the world, no longer permits them to go out

unveiled. From this time forward they remain in the harem or women's apartments, where they can only associate with their own sex. The females of the lower classes are not locked up in harems, and hence enjoy much greater liberty.

The food of the Persians is plain, yet of a tolerably diversified character. Their bread is baked of wheat flour. Two principal meals are taken : the one in the morning at about eleven o'clock, consisting of dishes of milk, fruit, and pastry ; the other at sunset, when more substantial food, pilau, meat, and vegetables are eaten. At their meals the Persians sit upon carpets on the ground, with their legs turned under them. (*Pl. 17, fig. 4*, a Persian meal.) Wine and liquors are prohibited, but frequently partaken of in private. Coffee, tea, and sherbet are the usual drinks. Tobacco smoking is universal. The Persians are very fond of ceremonious courtesies. Their amusements consist in chess, which they play well, readings or recitals of fairy tales, music, and dancing. A warlike game of theirs is the *keikadshin* (*pl. 17, fig. 3*). Hunting, particularly the chase of the antelope, constitutes one of the principal recreations of people of rank. The baths also belong to their places of pleasurable resort. Hence baths have not only dressing apartments, but also parlors and saloons, and are generally arranged very conveniently and luxuriously.

The Persians may be divided into four classes : 1. The officers of the court, state and military ; 2, Inhabitants of the cities, merchants, craftsmen, &c. ; 3, Villagers ; and 4, The nomadic tribes. The first class, being treated with merciless tyranny by the Shah, their lord, who tolerates no opposition, take their revenge upon their own inferiors ; and in this manner tyranny is continued downwards step by step. Hence no subject is for a moment secure of his life and property. Farmers and tenants fare the worst in this respect. The nomadic tribes, the *Illyats* (*Illyats*, *Illyats*), constitute the main body of the army. They are brave, but undisciplined, and very rapacious. They serve the Shah as mercenary troops, for pay, and for the purpose of obtaining booty. In the spring they leave their retreats, assemble at the place to which they are ordered, engage only for a single campaign, and in winter return to their tribes. They are mostly of Turkish, Lurish, Kurdish, and Arabian stocks.

The *Tadshiks* and the higher classes make use of the modern Persian language, which is divided into that of the court (*Deri*), and that of the people (*Voland*). The latter has characters of its own, but the former is written with Arabic letters.

The Persians differ from many other followers of Mohammed in considering Ali, the father-in-law of Mohammed, the prophet of God. They belong to the sect of the *Shiites*, who are mortal enemies of the *Sunnites*, among whom the Turks are classed. A few only are still fire-worshippers, and are called *Parsis* (*Parses*, *Persians*). The chief of the followers of Ali is called *Sheikh Islam*, that is to say, the patriarch of the true faith. Under him rank the *muftis*, under these the *kafis* and *mollas* (judges), the *imaums* (preachers and proclaimers of prayers), and the *dervises* (monks).

Crime is barbarously punished among the Persians. Tearing out the

eyes is one kind of punishment, administered especially to people of rank. Beheading is the usual mode of execution. For offences of trifling importance the bastinado (blows upon the soles of the feet, *pl.* 17, *fig.* 6) and the pillory are applied. The representation at *fig.* 7 shows the peculiar stocks which in the latter punishment are attached around the neck and to the right arm. Fines also are not unusual.

The musical instruments of the Persians consist of long straight horns of various sizes, and of kettle-drums, which are frequently beaten with the bare hands (*fig.* 3).

If a Persian has several legitimate wives (as a Moslem, he is not permitted to have more than four), the one first married ranks highest according to a law, which, however, is frequently disregarded. The bride proceeds to meet her future husband entirely enveloped in a red veil, and upon a horse sent by him; the presents of the groom being often carried before her in open coffers overlaid with red silk covers. One of the conductors of the bridegroom carries a candle, the other a torch, and behind him goes a drummer. (*Fig.* 1, marriage ceremonies.) Women of rank travel in a closed litter, which is borne by mules and has lattice-work at the sides (*fig.* 2).

When a Persian is dying, a fire is kindled on the roof of his house, that every passer-by may pray for the departing soul. The last breath having been drawn, the corpse is forthwith carefully washed. After this, the body is laid out upon a bed of state (*pl.* 20, *fig.* 8), and the relatives and friends meet in order to lament their loss, the nearest relatives showing their distress by tearing their clothes and strewing their heads with ashes. The corpse is then wrapped in a cloth inscribed with passages from the Koran, and laid in a coffin on a bed of spices, lime, and salt, which is then placed in a pit furnished with a flight of stairs.

The dress of a Persian Shah is represented in *pl.* 15, *fig.* 2; that of the Khans and officers of court in *figs.* 1, and 3-6; that of a lady in *fig.* 7; and that of common people in *figs.* 8 and 9. *Pl.* 16, *fig.* 9, a Persian of rank with his attendants.

The Arabs.

The Arabs (South Semites), who have inhabited Arabia from time immemorial, are either herdsmen, agriculturists, or inhabitants of towns (Moors). The settled Arabs of Africa are more especially denominated Moors. The pastoral Arabs are called, in the language of the country, *Ebn el Arab*, i. e. Arab's son, or also *Bedauvi*, which the Europeans have rendered by *Bedouin*. The agriculturist is called *Fehla*, and an inhabitant of a town *Haddri*. The people of the towns are blended with the Turks, and have imbibed their manners without having laid aside the principal peculiar traits of the inhabitants of the deserts. The *Fehlakin* (plural of *Fehla*) are of large strong frame, and do not possess the keen, fiery eyes of the Bedouins, nor their silky beards, being, moreover, inferior to them

in intellect. The Fehlahin wear long, coarse cotton shirts, held together by a leather belt of a hand's-breadth, and over them is worn a kind of cloak of goat's or camel's hair; in winter, however, a sheepskin coat. A piece of striped cloth, with fringe, covers the head. (*Pl. 13, fig. 11*, head-dress of a Fehla.) The neck and feet are left bare. Rich Sheikhs sometimes, upon occasions of ceremony, wear a silk cloak, or a cloth coat, over the shirt. The women dress like the Bedouins. The Fehlahin live, in part, in the numerous large and fine ruins of the times of the ancient Greeks and Romans; in part in hovels of earth, or in mountain caves. The household furniture is of a very simple character. Wealth is computed according to the number of their yoke of cattle, or the number of acres held; and by the same rules their taxes, which are high, are adjusted. Besides the payment of these taxes, they are obliged to provide for all soldiers marching through their districts, which is the more burdensome as they are all horsemen. Extraordinary imposts and rapacious inroads of the hordes of Bedouins, reduce these people to the greatest misery. The attacks of robbers, or scarcity of water, frequently compel them to abandon entire villages. Towards strangers, the poor Fehlahin are very polite and hospitable, and never demand anything for the lodging afforded. The Sheikh of each village is, moreover, bound to keep a free tavern, in which every guest can claim food and one night's rest. Wheaten groats and sour milk are the principal fare of the Fehlahin.

In the large towns, slaves, mostly negroes, are found in all families whose circumstances allow it. Slavery here, as in almost all Mohammedan countries, is, however, not of a rigorous character.

Arabia has never been a state, not even in the times of the mightiest Caliphs. At present, the country may contain, perhaps, several hundred independent tribes, or small states, if this term can properly be applied to them. The island-like situation of the country has always restrained foreign conquerors; the power of the Persians among them was very trifling, and even the strength of the Romans was wrecked in the deserts of Arabia. Each tribe has its chief, usually called *Sherif*. Chiefs of less importance are called *Shechs* (Sheikhs) or *Emirs*.

Mecca is the centre of the Arabian as of the Mohammedan world; it is a place of conflux, not only for all the tribes, but for many foreign people also; hence the population is greatly mixed. All males born in Mecca and Dshidda are tattooed on the face, by the parents, as early as the fortieth day after the birth of the child, three long incisions being made on both its cheeks and on the right temple. The Bedouins do not observe this custom, but the men of Mecca are proud of the distinction, which excludes other inhabitants of the Hedjaz, in foreign countries, from the claim to the honor of being natives of the holy city. In very few instances, girls are also tattooed. The complexion of the people of Mecca is a dull, yellowish brown, clearer or darker according to the origin of the mother, who very often is an Abyssinian slave. Their physiognomy resembles very much that of the Bedouins, and this is chiefly the case with the Sherifs, or members of the oldest and noblest families, who claim direct

descent from the Prophet. They have the face, eyes, and aquiline nose of the Bedouins; the countenance is very handsome, but more fleshy than that of the latter people. The lower ranks of Mecca, generally, are very strong and muscular; the higher classes, on the contrary, are of slender, fleshless figure; and similar in this respect are also the inhabitants deriving their origin from Yemen or India. The dress of the higher ranks consists, in winter, of a cloth *benish*, or overcoat, and a *dshubbe*, or under garment, likewise of cloth, and cut like those worn in all parts of the Ottoman Empire. A long, glistening, silk coat, bound with a thin Cashmere sash, a white muslin turban, and yellow slippers, constitute the remainder of the dress. In summer, a benish of India silk stuffs is worn. People of the highest ranks, who wear the Turkish costume, have red caps from Barbary under the turban. Those worn by the other classes are of linen, richly embroidered with silk, the work of the women, and usually given as presents to their lovers. The long coats of well dressed persons of the middle rank are generally of white India muslin, without lining; they are called *beden*, and differ from the common Levantine *anteri*, which is very short, without sleeves, and hence much cooler. Over the *beden* a *dshubbe* of light cloth or India silk is worn, which in hot weather is hung loosely over the shoulders. The under shirts are of India silk, or Egyptian or Arabian linen. In summer, the lower ranks wear only a shirt, and around it a piece of nankeen instead of pantaloons; in winter, a striped *beden* of India chintz, without a girdle. The middle and lower classes use sandals, those coming from Yemen being the best. In summer, many have mere caps, without the turban. The latter usually consists of cambric or muslin; each class having a mode of winding it round the head peculiar to itself. The Ulema, or learned body, allow the end to fall down in a small fold to the middle of the cheeks. In some parts of the country, men of rank wear red hats, shaped like the round hats of Europeans. The women of Mecca and Dshidda are dressed in India silk frocks, and very long blue striped trowsers, reaching to the ankles, embroidered at the bottom with silver thread. Over these they wear a wide frock, called *habra*, of black silk stuff, customary also in Syria and Egypt, or a blue and white striped *mellay*. The face is concealed by a white or blue *borks*; upon the head covered with the *mellay*, they wear a cap, around which a piece of colored muslin is wound in tight folds. The head-dress is encircled and ornamented by a row of gold coins. Many wear golden necklaces and armlets, and rings of silver around the ankles. The people of Mecca are principally engaged in commerce.

The Bedouins (*Bedovi*, or *Bedauvi*, signifying in Arabic "vagrants," or "inhabitants of the desert") have sprung from Arabia, and are spread over the southwestern part of Asia and northern Africa. Since the earliest times they have remained almost entirely unchanged, and hence are proud of the purity of their blood and their steadfastly maintained liberty. The doctrines of Islam have made but little alteration in their customs. All of them are very indifferent professors of this faith, and those inhabiting the interior of the desert scarcely know the name of Mohammed. They

mostly lead a roaming life, are divided into many tribes, each of which is commanded by an Emir, and is again separated into families, with a Sheikh at the head of each. They have no well defined laws, but follow only their customs and usages. Their camels, their horses of the noblest breed, and their cattle, the most important part of their property, constitute the entire wealth of this people; and the rearing of live stock, together with hunting and robbery, affords their only means of support. The complexion of the Bedouins is brown, but there are many women among them that resemble Europeans in fairness, in consequence of little exposure to the sun. In figure they are generally slender, and rather short. The hair is curly; the beard short and raven black; the eyes are small and fiery. Their dexterity, their activity and bodily strength, are oftentimes extraordinary. They are excellent horsemen. Among them, love of liberty and hospitality are associated with bravery, rapacity, and revenge. Caravans and single travellers are unsparingly plundered. They fall upon the former from different sides, like a swarm of bees, but seldom take life in these attacks, and fly if vigorous resistance is made. Every stranger, on the other hand, be he Christian or Mohammédan, who comes into their camp, which consists of a circle of tents, is received with the greatest hospitality; and without recompense they divide their all with him, and protect him with property and life. Even travellers just plundered are afterwards received in a friendly manner by their robbers, and obtain presents from them. The weapons of the Bedouins are the sabre and dagger, but chiefly a lance from ten to thirteen feet in length, having a long triangular head. Sometimes they have javelins, clubs, pistols, and rifles. The Emirs have but little authority over their subjects, and are equally liable to the penalties of the wild custom of bloody revenge for injuries which has prevailed from the remotest times.

Two different kinds of tradesmen only are found among the Bedouins, viz. weavers and farriers, the few household materials needed being made by each person for himself. It is a difficult matter to specify the individual tribes. In the Arabian desert there are: *Miseny*, living poor and unknown in the peninsula of Petrea; *Wuld-Ali*, in Central and Northern Arabia; *Beni-Khaled*, *Beni-Kiab*, *Beni-Lam*, and *Montesik*. In the Mesopotamian desert: *Tai*. In the Syrian: *Mavali*, *Beni-Szaher*, *Pahely*, *Anasse*, and many others. Besides these, there are numerous tribes in North Africa.

Pl. 13, figs. 11 and 12, Arabs of Gaza and its vicinity; *fig. 13*, Arab of rank, with the above described red hat, white and blue striped under dress, nankeen cloth, red stockings, and yellow shoes; *fig. 14*, Arab merchant, with white under garment; white and red striped sash and turban; white and blue striped overcoat; red stockings, and yellow shoes. *Fig. 15*, Arab girl of the lower classes, with white and red striped gown, the arm and bosom left bare; a panther skin around the hips; a white cap, ornamented with red riband; the hair in long pendent plaits, and sandals on the feet. *Fig. 1, k*, exhibits the head-dress of Arabs of the desert. *Pl. 19, fig. 1*, Assemblage of nomadic Arabs around their Sheikh; *fig. 2*, Encamp-

ment of a Bedouin family; *fig. 3*, Arabian concert; *fig. 4*, Performance of Arab dancing girls (*Almehs*); *pl. 20, fig. 7*, Mode of salutation among men of Arabia.

The Beludshis.

The Beludshis, or *Beluchis*, are the inhabitants of Beluchistan, a large South Persian province, formerly included in East Persia, and only explored since the year 1810. They are slender, well formed, and active, but of comparatively inferior physical strength. Their complexion is dark; their hair black. All of them are very fond of robbery, and consider the bold pillage of a foreign territory as honorable in a high degree; they fear no danger, and are brave in battle. Their mode of life, with the exception of the inhabitants of cities (who are engaged in navigation and commerce), is the patriarchal pastoral. Their dwellings are tents and huts. They inhabit the country together with the Brahus, a nomadic people; and are subjects of a Khan common to both, to whom they pay tribute and in war furnish a contingent of troops. (*Pl. 15, fig. 10*, a warrior in full equipment.)

The Afghans.

The Afghans are a powerful nation west of the Indus. They are called by the Persians *Af'gan* or *Ag'uan*, by themselves *Pushtan* (in the plural, *Pushtanneh*); in India, *Pitan* and *Patan*; by the Arabs, *Solimani*. The Afghans are, in a great measure, a pastoral people; a small portion only being settled and pursuing agriculture. They are divided into a great multitude of tribes, differing essentially in usages, habits, and manner of living, although speaking the same language and forming one nation. The *Berdurani* are the tribes in the north-eastern section of Afghanistan, between the high mountains of Hindoo Khash, the Indus, the Salt range, and the Soliman mountains. The *Damani* inhabit the province of *Daman*; the *Solimani*, the *Soliman-Kuh*; the *Durani* live in the steppes of the table land of East Iran, between the two cities Kandahar and Herat, inhabit also the first named city, and consider themselves the noblest stock of their nation. The *Ghilshi*, finally, constitute the principal tribe of the Afghans, and occupy the country between Candahar, Cabul, the Paropamisus, and Hindoo Khash, east of the Durani. *Pl. 15, fig. 12*, represents an Afghan of the tribe of Durani wearing a red interwoven under garment, wide trowsers, a yellow cap, and a blue cloak. His weapons are a long gun and sword. The dress of the tribe of the *Ghilshi* is entirely white, with the exception of a scarlet sash, and consists of a long coat, wide trowsers, and turban. Many tribes also wear tight fitting pantaloons, a short shirt, and pointed cap. *Pl. 19, fig. 5*, shows the mode of travelling adopted by persons of distinction; and *fig. 6*, that customary among the lower classes of people in Afghanistan and in Lahore (India). The Afghans profess the

Sunnite Islam. The provinces of the empire are divided among the men of rank, who possess unlimited authority, which passes also by inheritance. They are a well shaped, hardy race, proud and insolent, and, long accustomed only to robbery and war, are strangers to all polite education.

The Hindoos.

The Hindoos (about 14 millions) are the aborigines of the East Indies. They are of medium size; of slender, regular, but not powerful build; have a brownish yellow or olive colored, shining, and very soft skin, which, however, is of a dirty appearance. Their eyes are rather soft than fiery; the brows handsomely arched; the hair soft, black, and glossy. The women are more delicately formed than the men; both, however, have small hands and feet. They are temperate, intelligent, and skilful; generally of a mild disposition, but cowardly, crafty, deceitful, and very arrogant towards their inferiors in position or strength.

The Hindoos are divided into five principal castes, the four first of which are considered noble, the fifth, ignoble; with subdivisions in all. The *Brahmins* form the highest and noblest caste. They are honored by all the rest as superior beings, who must be treated with the greatest respect. They are permitted neither to be under the same roof with a person of a different caste, nor to taste anything not prepared by a Brahmin. They consist mostly of priests, officers of state, and learned men; many, nevertheless, are engaged in mechanical arts, commerce, and the cultivation of fields and gardens. They are not allowed to drink wine, eat flesh, or chew betel.

Next in rank follow the *Tshetries*, *Râdshas*, or *Kshatrias*; to whom belong the sovereigns, princes, and warriors.

The third class, the *Vaishis*, *Vaishias*, or *Vassiers*, are engaged in rearing cattle, agriculture, horticulture, and commerce. They are educated, moral, and industrious, and are believers in the doctrine of transmigration of souls. Hence they kill no animal, not even a small insect, and even purchase animals about to be slaughtered in order to preserve their lives, and nurse aged or sick animals at their own expense.

The Shuders, or *Sudras*, constitute the last of the noble castes. They are either engaged in the arts and handicrafts, or are monks, soothsayers, magicians, and jugglers. The lowest division of this caste consists of the curriers, who are at the same time shoemakers; of the butchers, who are also executioners; and the bayaderes or public dancing women.

There are several middle classes besides, that have arisen from a mixture of the pure castes, and who are not respected, but are yet esteemed much higher than the fifth class, which contains the unfortunate *Pariahs*. The Pariahs are condemned, from their very birth, to pass their lives in the bitterest misery, and are universally despised and even abominated. They are obliged to perform duties of the lowest description, which would be degrading to all other castes. They neither perform the prescribed ablu-

tions, nor abstain from forbidden food. They dwell in holes or huts, and are only admitted into the house of a Hindoo through a particular door. They are not allowed to touch a person belonging to another caste, must stand far distant from him, and hold the hand in front of the mouth when they speak to him. The Pariahs are herdsmen or menial servants among the Hindoos, and soldiers, porters, cooks, &c., among Europeans. The Poolias form a particular division of the Pariahs, living upon the west coast of the peninsula, west of the Ganges.

Rice is the principal food of the Hindoos; besides this, other kinds of grain are also eaten. Flesh diet, as has already been remarked, is not permitted to every caste. At their meals they sit squatted down; they wash themselves before and after eating. The usual drink is water, but also spirituous liquors. Spoons, knives and forks, dishes and plates, they have not; hands supply the places of the three first, and leaves of trees those of the two latter. The household furniture is very simple. They have no beds, but lie upon coverings spread upon the floor.

The dress is for the most part plain. The lower classes usually twist a piece of stuff around the hips and pass it between the legs, leaving the rest of the body bare or wearing a light garment over it. Sandals and shoes constitute the dress of the feet, and in several districts both sexes wear wide trowsers. The head-dress of both men and women consists of a fine cloth wound around the head in the manner of a turban.

Nearly all the men shave their heads; some castes, however, leave a tuft of hair on the crown, and the Brahmins on the hind part of the head. The women wear their hair according to their own fancy. Only widows in their mourning, and criminals, are obliged to have their heads shaved. Most of the men wear mustachios. Women usually tattoo themselves; both sexes of all castes paint a black line around the eyes, and color the palms of the hands and soles of the feet red. The Brahmins wear as a sign of their rank a cotton cord, which is a combination of twenty-seven small cords, and hangs over the breast, shoulder, and back. *Pl. 20, figs. 1-3*, Indian women and girls; *fig. 4*, slaves of a harem of Santorin; *fig. 5*, Indian women in a harem.

Chess, said to have been invented in the East Indies, is the usual game of the Hindoos. Somewhat similar to it is the game of four kings, played by that number of persons. Hunting is likewise one of their principal recreations. They seek to amuse themselves besides by listening to tellers of stories and ballad-singers, by witnessing the extraordinary gymnastic feats of the jugglers, or the dances of the bayaderes. Theatrical performances and pantomimes also are exhibited in India. A number of musical instruments are used, but very inferior to our own.

The Indians have a sacred language, the *Sanscrit*, and a language of the people. The former is a dead language, and understood only by a few learned men, remaining entirely unknown to the masses. In Sanscrit are written most of their works esteemed classical. The Mongolo-Hindustanee is the most common dialect of the popular language, especially in the northern section. The Persian is the language of the court. The *Car-*

nata, Telinga, Tamul, Malabar, Maratta, and the *Malay*, are the five principal languages of the Deccan.

The *decimal system* and *algebra* are said to have originated in India. The study of astronomy has been pursued in the East Indies since the earliest times; but although the Hindoos have made greater advances in this science than many other nations, they still entertain very erroneous and imperfect ideas of the planetary system. They hold, for instance, that the earth stands in the centre, and that the sun, moon, and stars revolve about it; that the planets are propelled in their orbits by currents of air; and that the stars, moved by strong whirlwinds, perform their revolutions around the earth with prodigious swiftness in twenty-four hours.

The Hindoos sacrifice bulls and horses to the gods, white being the preferred color for the victims. Human sacrifices, though not allowed, are yet said to take place secretly.

Famine, an affliction not of rare occurrence, owing to oft repeated droughts, frequently constrains parents to kill their children, or, more commonly, to sell them for provisions or money. This traffic in human flesh is, however, said to be carried on also in times of abundance. Suicide is of frequent occurrence in India, and the Brahmins even endeavor to cause and promote its commission. It is an ancient custom for the wife, after the death of her husband, to be burned alive with the corpse; and if the man has several consorts, some of them not unfrequently dispute who shall have the honor. As a rule, wives desirous of distinguishing themselves in this manner are already advanced in years, and have sad prospects for the future, in case they remain alive, since they would be a burden to their relations. Hence the latter, as well as the Brahmins, try to persuade them to sacrifice themselves. The English have attempted to abolish this cruel custom; it is said, nevertheless, to be by no means entirely extirpated. (*Pl. 21, fig. 2*, Burning of a Hindoo widow with the corpse of her spouse.) The sick and dying are very harshly treated in India. Funeral solemnities differ according to the castes. The dead are either burnt or thrown into a sacred stream, especially into the Ganges, or buried, the lower castes especially adopting the last manner. As the dead are considered unclean, they are removed as soon as possible; not through the usual entrance of the house, but through a particular door, Pariahs carrying them in a sitting posture. It is the same passage through which the latter enter the houses with downcast eyes.

All Hindoos look upon matrimony as a sacred state into which every one is bound to enter. Polygamy is lawful, but only distinguished and rich persons make use of the privilege. There are two modes of marriage, one by means of the *pariam*, the other by means of the *kaningadanam*. Sums of from twenty to thirty dollars, which the father of the bridegroom pays, before the wedding, as the purchase price to the bride's father, are called "*pariam*." "*Kaningadanam*," that is to say, "*present of a virgin*," is the name of the transaction, when a rich sinner gives a sufficient sum to a poor Brahmin to enable him to marry, or yields up his daughter as a spouse to a poor relative, who is not in a condition to pay the

pariam. In such a case, however, the receiver must take upon himself all the sins of the liberal benefactor, and hence marriages of this sort are rare. The settling of a marriage contract is preceded by many formalities, mostly superstitious, at which astrologers and soothsayers play no unimportant part. On the wedding day, the invited relatives and friends assemble at the house of the bridegroom, and thence go to the dwelling of the bride. In front go the porters, carrying the nuptial presents intended for the bride. In one of the baskets is found the *pariekure*, or sash, which, even amongst the poorest people, must be of silk, and is designed only for the adornment of the bride on the marriage day. In place of the pariam, men of rank give a costly jewel, or a rich ornament, which is laid upon the *pariekure*. As soon as the party have arrived at the house, the basket with the last named article is uncovered in the presence of the whole assemblage; the pariam is then presented by the father of the bridegroom to the father of the bride, with the words, "The money is thine, and the daughter is mine;" whereupon the latter answer, "The money is mine, and the daughter is thine." Hereupon the Brahmin, amid kind congratulations, ratifies the completed union. In the place of our wedding-ring, the *tali*, a small gold figure, often a tiger's tooth set in gold, is the nuptial symbol. This is consecrated at the marriage by the Brahmin, and handed to the bridegroom, who hangs it around the neck of the bride. Rich and distinguished persons have sometimes a number of additional ceremonies at their weddings; and not unfrequently the newly married couple, seated opposite to each other in a palanquin, are borne for several days through the principal streets, escorted by their relatives, friends, and servants, and surrounded by numbers of musicians and dancing women. The expense of the wedding and subsequent ceremonies falls upon the groom's father alone; and including presents to the Brahmins, who come to the weddings of the wealthy from the vicinity, and even distances of thirty or forty miles, amounts to a very large sum. *Pl. 21, fig. 4*, represents a procession of an East Indian bridal party; *fig. 3*, exhibits the wedding ceremonies of the *Zingaroos*, an Indian gipsy stock. The Zigeune (or Gipsy) takes his bride by one hand, and in the other holds a jug, which he throws high in the air, by way of determining the duration of his marriage, which is done by counting the pieces into which the jug is broken when falling, the marriage being valid for as many years as there are pieces. In case the bride does not please him, however, the Zigeune, if so inclined, dissolves the connexion even at an earlier period than the time indicated by the above ceremony; neither is his young wife bound to observe strict fidelity.

The religious festivals of the Hindoos are very numerous; about a hundred of them are reckoned, and nearly every god has his own. On such holidays, the pagodas (temples) are ornamented with garlands, muslin handkerchiefs, and costly stuffs. One of the most important festivals is the *tirunal*, or car festival (*pl. 20, fig. 6*), which is annually celebrated during a period of ten days, in remembrance of the consecration of each great pagoda. Pilgrims approach from the neighborhood and from a distance, according as the pagoda is more or less renowned. Large bands

of music, on the eve of the festival, march through the streets and places through which the procession is to pass on the following day. On the first day, the procession takes place only in the interior of the pagoda; from the second to the sixth day, the figure of the divinity to whom the temple is consecrated is borne through the streets in solemn array and with music. On the seventh, however, it is placed in the uppermost window of the temple tower, when all the people rush to the pagoda, in order to deposit in the hands of Brahmins rich offerings for the divinity. On the eighth and ninth days, the Brahmins themselves carry the likeness of the god about within the temple; on the tenth day, the festival is closed with the principal procession through the streets. The gong (*tantam*), firing of cannon, and explosions of gunpowder, are the signals for assembling. A crowd of musicians, with noisy instruments, form the head of the procession; a number of whom, gliding on their backs, keep up with the others and maintain the time of the tune, a performance considered particularly meritorious. After these follow several thousand worshippers, in two rows, with gaudy flags, parasols, banners, and a staff three feet long, on one end of which an oil lamp is fastened, the processions usually commencing towards nightfall. Then, often borne by thirty or forty men, comes the image screen, called *Ter*, in the form of a temple with pillars, and containing the idol ornamented with costly jewels. This small portable chapel is frequently placed upon a prodigious car resting upon four wheels, richly ornamented, furnished with a gaudy canopy and numerous flags, and drawn by a great multitude of persons. Around the idol and its car the *dewadashis* perform their sacred dance. Youths, overburdened with finery, go behind the car; and officers of government and the authorities generally, together with the rich and men of rank, bring up the close of the procession. From time to time it stops near small chapels erected for the purpose, in which the idol, being taken from the car, is placed for a little while. For the particular edification of the worshippers, a number of small puppets, suspended on silk strings, descend from the upper part of the chapel, paying, as it were, their respects to the divinity, and dancing and jumping around its image. During this solemn procession, the pious phrensy of the people often goes to such lengths, that some persons, either in order to wipe away their sins, or the more certainly to obtain future salvation by means of their self-immolation, place themselves in the track of the immense car to be crushed by its wheels. The plaintive cries of the dying, if indeed they utter anything of the sort, are smothered by the crashing music and the noise of the passing multitude of people.

Many different kinds of oblations, and various accompanying ceremonies, occur among the Hindoos. They are partly such as are daily offered to the gods, in order to obtain from them protection and favor; partly of a solemn, mysterious nature, which take place only at certain times. The offerings consist of all sorts of provisions, flowers, spices, and money. All are acceptable to the Brahmins, as they form a part of their subsistence. Blood, as a rule, is not shed at the oblations; in certain cases, however, living animals are the victims, and it is even said that human beings have

sometimes been sacrificed. Even at the present time, something similar to this is shown at the offering *tukam*, when not only a number of cocks are sacrificed to *Parvati* (*Bahvani*), but a penitent has the skin of his back perforated with one or two iron hooks attached to a kind of balance gallows, on which he is elevated in the air in this inconvenient and painful situation, and then turned about amidst exultations to pray to the goddess (*pl. 21, fig. 1*). According to the information given by Sonnerat, this offering appertains to *Mariatale*, the goddess of the small-pox. It is done at the celebration of the festival *Quedil* (in the month *Chittere*, *i. e.* April), when persons who believe themselves pre-eminently beholden to the goddess, or wish to obtain peculiar benefits from her, cause themselves to be suspended on a long lever, by a double hook which goes through the fleshy part of the back. With a lemon in one hand, and a sword or shield in the other, a fanatic of this sort is obliged with a cheerful countenance to play the part of a combatant. In this situation, he is turned by another several times up, down, and around the pole. The sufferer, however, not only loses the entire advantage of this cruel juggling, but even forfeits the honor of his caste, if by complaints and groans he shows any dissatisfaction. As the goddess *Mariatale* belongs to an inferior order, this festival is celebrated only by the lowest ranks of people, chiefly by the Pariahs.

Pl. 18, fig. 1, gives us a representation of an East India expedition of soldiers, presenting the march of the Rajah of Cutch (English East Indian possessions) at the head of his vassals; and *fig. 2* displays a national spectacle in the English East Indian possession Cattiawar, viz. a caravan with its escort making a pilgrimage to a temple.

The Further Indians.

The population of *Further India* consists, in the south, of Malays; in the north-west of Caucasians; the remaining and largest portion being Mongols. The greater part of these Mongols are Buddhists, and except the monosyllabic language, have nothing in common with the Chinese. The Malays are followers of Islam. Gold and silversmiths' work and ship-building are the principal industrial arts of the inhabitants; but the Cochin-Chinese, the neighbors of China, have, by the assistance of Europeans, made progress in ship-building and the art of war; hence they pay the greatest attention to commerce, being second only to the Birmans, Europeans, and Chinese, who carry it on with greater energy. The government is despotic.

The Usbeks.

The Usbeks (*pl. 15, fig. 11*) are a nomadic nation of horsemen inhabiting Bucharía (Bokhara), or Usbekistan, in the south of Bucharía, but who have also spread over other parts of the country. They formerly resided in the

heart of Asia, south of the Celestial Mountains, but in the latter part of the fifteenth century penetrated into Bucharía. They spring from the Turks; are strong, handsome, and tall; their faces resemble the Mongolian only in complexion. Their eyes are large and piercing.

The Usbeks are hospitable, but at the same time very niggardly, and hence live in an extremely frugal manner at home, but are insatiable where indulgence costs them nothing. In general, they possess a martial disposition, but are good only for short expeditions. Their manner of fighting wants spirit and courage; the first attack decides the battle; if this fails, the leader immediately takes to flight. If victorious, on the contrary, they pursue the enemy relentlessly, cut down in the most unmerciful manner those offering resistance, and carry away the defenceless as slaves. Sabre, bow and arrows, lance and knife, are their principal weapons. Their dress is always wadded, and frequently very expensive.

The Chinese.

The Chinese are of medium stature, and their limbs, more especially at the extremities, small. The color of the skin is brownish yellow; the inhabitants of the northern provinces have a lighter complexion. Mandarins, the rich, and ladies who are shut up in their harems, are also lighter colored than the lower classes, for example, the coolies, or porters, who are always exposed to the air. The face is broad and flat, with prominent cheek bones; the nostrils are wide; the eyes stand far apart, and are obliquely set. The hair is deep black and the beard thin. The fair sex is distinguished for extremely short feet, which are, however, very broad, and almost resemble the feet of horses, receiving their form, not from nature, but by means of art, since they are confined by hard shoes worn from childhood, causing the ankles to swell up, and making it very troublesome for them to walk.

The Chinese wear a full garment, shaped like our wide dressing-gown, covering the whole of the body, fastened with buttons, and having wide sleeves tapering down towards the hand. This outer garment is of cotton or silk, and, in summer, without lining; in winter, it is lined with cotton or fur. In the former season, according as the weather is more or less cool, several such garments are worn, one over the other. Blue is the prevailing, or rather prescribed color for male dress; next in favor are violet and black. High officers of state are dressed, on days of ceremony, in satin with a red ground; none but the Emperor and princes of the blood are allowed to wear yellow. The fair sex dress principally in pink; also in grey and red. A girdle around the waist serves at times for carrying weapons, the tobacco pouch, knife and chopsticks, and, in summer, fans, even with men. A wide jerkin is the only garment of the countryman. Below the tunic, long cotton, linen, or silk under garments are worn; and under the latter, wide trowsers of nankeen or silk, covering the whole of the legs. The boots are made of silk and nankeen; for people of rank, sometimes

of velvet. The shoes, which more resemble slippers, are likewise of nankeen, &c. ; the soles of both consist merely of thick pasteboard. The caps of the rich are round, short, conical, of cherry-colored satin with red tassels, and frequently trimmed with costly furs. A button manufactured out of a precious stone adorns the cap of officers of state, the color and value of which differ according to the rank of the functionary. The Chinese of ordinary rank goes either without a covering for his head, or wears a short, conically shaped, wide brimmed hat, finely plaited, of bamboo cane ; this is also worn in summer by people of rank. Men shave their heads, leaving a tress on the crown. Women wear the whole of their hair, secured with two large pins, and decorate it with other gold ornaments besides. It is combed straight up from the forehead, and fastened in a knot behind. The eyebrows are colored black ; upon the under lip and chin is painted a round red spot, whilst the face is generally rouged and whitened very perceptibly.

Pl. 22, fig. 1, represents the Emperor of China in the imperial robes ; *fig. 2*, Empress ; *fig. 3*, Chinese Mandarins ; *fig. 4*, Chinese ladies of the court ; *fig. 5*, Bonzes (priests) ; *fig. 6*, Chinese of the inferior classes ; *fig. 7*, Corean of the lower ranks. The inhabitants of Corea (Coreans) wear short, wide, brown trowsers, long stockings, a short nankeen coat, and a black pointed hat.

The poor Chinese live principally on boiled rice or millet, with onions and garlic, made greasy with rancid oil ; pure oil does not suit the taste of the Chinese. These dishes are cooked and sold in the streets (*pl. 23, fig. 3*, Rice dealer). Tea is the universal drink. Persons of distinction enjoy more expensive and rarer viands, which are set on the table ready carved. Instead of forks, they make use of two pointed sticks (chopsticks), about twelve inches long, which are held in one hand with the thumb and three of the fingers. The Chinese drink wine unmixed, not out of glasses, however, but out of cups. Ceremonies are not wanting at banquets, but the cheerfulness and conviviality of Europeans under similar circumstances are not witnessed. More than from two to four never sit at one table. The tables are arranged in two rows, in such a manner that a space remains in the middle for theatrical performers.

Opium smoking is very common, although strictly prohibited. Those enjoying this luxury make use of peculiar small pipes, with exceedingly diminutive bowls ; and, besides opium, the smoker keeps about him some fine tobacco, which is rolled up in balls, in order to be thrust quickly into the pipe, in case of the intrusion of strangers.

The dwellings are plain, with the fronts generally turned towards the south. Even country people usually have houses built of brick, but mostly only of one story. The houses of men of rank have a second story for the chambers of women. The roofs are pavilion-like, jutting out over the house, and resting on pillars that sometimes form a colonnade. The tiles are often fancy-colored and glazed, or overlaid with varnish. The language of the Chinese does not sound agreeably ; that of the common people is divided into several dialects. The learned or written language, at the same time

that of the higher classes, is denominated *Kuan-hua*, or Mandarin dialect. In the written language each syllable has a mark for itself, and syllables are combined into words containing from two to three syllables. There are said to be not much over three hundred of such radical words, every one of which, however, has more than fifty meanings. The language spoken by the people generally has only a limited number of monosyllabic words, many of which can be distinguished only by the enunciation. The Chinese print and read, not from the left to the right side, or the reverse, but from the top downwards. Letters are always printed, never written.

From their earliest childhood, reverence and love towards parents are instilled into the minds of the Chinese. An offence against parents is punished in the severest manner, even with death. The Chinese are industrious, patient, enterprising, and skilful in imitating. Upon the whole, they are courteous; but as tradespeople, sly and crafty. The greater portion of the Chinese pursue agriculture; the implements of husbandry, however, are still very imperfect. Besides farming, they are engaged in fishing and hunting, rearing silkworms, trade, and commerce; less attention is paid to arts and sciences. With respect to improvements in the latter, this people are now as far behind as they were formerly in advance. Several supposed modern inventions, those of gunpowder and porcelain for example, were known to the Chinese long before these articles were heard of in Europe; many, on the contrary, now long familiar to us, remain unknown to the inhabitants of the Celestial Empire, who are also very deficient in the knowledge of the heavens and the computation of time, from causes which will be made evident in the course of this sketch. The principal religion of the Chinese is that of *Kon-fu-tse* (Confucius), who is said to have 1500 temples in China.

The Emperor of China is looked upon as the father of his people, and hence bears the title "Great Father." According to the belief of the Chinese, he is not of terrestrial origin, but a son of heaven, sovereign of the celestial empire, only ruler of the world. As he is father of the empire, so the governors are fathers of the provinces. The Emperor appears in public but seldom. He is assisted in his government of the country by a high council chosen from Mandchoo and Chinese, who guide the six ministers (of appointments, finances, ceremonies, war, justice, and public works). Under the ministers rank the several departments. In the provinces the highest power is in the hands of the vice-king. The Emperor, owing to his entire absolute will, enjoys such a slavish reverence, that the people are obliged to kneel down and touch the earth with the head nine times even before the mandates and documents issued by him. The pride arising from this reverence is manifested in a strange manner in the Emperor's dispatches to the European powers, whom he appears to deem entirely dependent on him, because they send embassies to China. The power of the Emperor is entirely unlimited, and the idea of paternity makes every opposition still more culpable. It is true that historiographers are placed over him, censors as it were of his actions, who record what he does, says, and everything that happens to him, and whose business it is to

warn him in case his inclinations lead him to do anything contrary to law ; but they are often compelled to pay with their lives for their love of truth. The people are oppressed in the harshest manner, and are not suffered to become enlightened, a prohibition the more easily enforced as the country is kept closed against foreigners, intercourse with whom is thus rendered very difficult. It is possible that a change is at hand in China, in consequence of the greater facilities of commerce obtained by the English through their fortunate victories ; for many of the weaknesses of the empire are now laid bare, new avenues to the people obtained by force or purchase, and thus the contact of foreign nations with the Chinese is rendered possible. Chinese civilization, which has been stationary for thousands of years, will very quickly feel foreign influence, and will not be able much longer to resist the English.

History does not show with precision how mental cultivation amongst the Chinese stopped suddenly in its glorious rise. An ancient account says : " In a large mountain range in the interior of Asia there lived once upon a time a model people very rich in experience and knowledge. When this nation could acquire no more new learning between their own mountains, they all left the country, and wandered forth towards the north and south, towards the east and west. The oldest and wisest, who stood together by a natural predilection, did not intend to wander far, and found rest in China. The aborigines approached in troops in order to acquire knowledge from them ; the wise men instructed all comers, and dispensed sciences and arts with full hands until they knew nothing more to teach. The natives now departed, and for the patriarchs nothing remained but to lie down and die. But as there were no descendants of these wise men, no one was capable of making advances in the cultivation of the sciences and arts, and thus nothing new was ever added to the stock of knowledge brought by the patriarchs."

The Chinese give another reason for their stationary condition. According to their chroniclers, China was first, and for a period of an unmeasurable number of years, ruled by gods, called *Trin-Hoan-Shi*. It is conceivable that these god-regents were able to instruct their subjects in many different arts, both useful and acceptable. But as feelings of tedium and discontent now frequently arise in Europe when a government has hardly seen fifty years, it cannot be made a matter of blame to the Chinese that a dynasty which had enjoyed the rule for several millions of years finally became obnoxious to the people. The nation came to a quick resolution and deposed the eternal sovereigns, who out of revenge took with them all finished and unfinished projects of reform, so that the Chinese were compelled to remain exactly where they had been standing.

History, which rejects such traditions, records no progress among the Chinese during many centuries. They have been found to be familiar with many things the proper use of which they were obliged to learn from the Europeans. Flavio Gioja of Amalfi invented his compass about four thousand years later than the Chinese. As early as 2600 years before the Christian era, the " Yellow Emperor" possessed a carriage, on the top of

which was a figure which always pointed towards the south, whatever might be the direction of the vehicle. Nevertheless the Chinese crept along the coasts in their clumsy junks, until the Europeans at last showed them the mode of finding their way on the open sea by the help of the magnetic needle. The Chinese invented gunpowder in the age of the birth of Christ, but cannons and guns would have been unknown to them without the Europeans. Printing was practised by them five hundred years earlier than by the Europeans, but they print even at the present time, like the first European wood cutters, by means of immovable tablets, on which the characters are cut. Their physicians base their entire art upon the miraculous harmony of the number five ; in the five points where they feel the pulse, the five intestines, the five planets, and the five elements. Their astronomers know with certainty that the stars rise and set only in order to announce the elevation and fall of dynasties, and at similar levels stand the remaining sciences.

These are only single features of Chinese civilization, to which, however, might be added others without number. Does this blighted blossom spring from a healthy stock ? Can that be a vigorous, moral nation, which for centuries has produced no man of sufficient powers to enlarge the confines of science ? Bœotia, after a long rest, produced a Pindar : China has neglected to exercise her powers for too great a length of time to have much vitality ; her existence is only the semblance of life.

After this general description of the Chinese nation, we will now mention more particularly a few customs and usages.

No nation attaches such importance to ceremonies and the duties of politeness as the Chinese. Among men the usual mode of saluting each other is as follows : they fold the hands upon the breast, move them in a peculiar manner, then incline the head somewhat, but not much, and at the same time say *zin-zin*, a courteous exclamation without settled meaning. If an individual meets a person entitled to a greater degree of respect, he claps his hands, raises them, then lowers them almost to the ground, and at the same time bends the head very low. When two acquaintances see each other again for the first time after a long separation, both fall twice or three times upon their knees, and bow to the ground. If two *quang* or *mandarins* of the same rank meet in the street, they greet each other without rising or descending from their sedan chairs, by clapping the hands and then lowering and raising them to the head ; which process is repeated until they can see each other no longer. If, however, one of them ranks higher than the other, the latter is obliged to stop with his sedan, or if on horseback, to dismount, and make a low bow. On this account, officers of an inferior rank endeavor to avoid meeting their superiors. A main point of Chinese politeness consists in the payment of visits to each other. (*Pl. 25, fig. 2*, mandarin paying visits.) In visiting, it is above all requisite to deliver to the doorkeeper a portentous visiting card called "*Tye-ze*." This article consists of a sheet of red paper with gilt flowers, and folds up like a screen. Upon it, the name of the visitor is printed, together with some respectful expressions, which differ according to the rank or standing

of the person to whom the visit is paid. For mourning, white paper is taken. Sometimes a mandarin is satisfied with receiving the "*tye-ze*," and then tells the stranger that he need not trouble himself about descending from his sedan. This, however, occurs only when mere visits of politeness are paid. The reverence manifested towards the Chinese Emperor conforms to his absolute power, and is almost equivalent to worship. No one, not even his eldest brother, is allowed to speak to him otherwise than kneeling. The grantees constituting his daily society are alone permitted to stand in his presence, and address him, merely bowing one knee. Similar testimonies of respect are due even to the things used by the Emperor, for instance the throne, the robes, &c. A peculiar right of the Emperor is the power enjoyed by him of selecting, not the firstborn of his sons or kinsmen, as his successor, but the one whom he considers best qualified; and should he deem none of his own relations capable, he is allowed to appoint the most deserving individual of his subjects heir to the throne. Hence the greatest attention is bestowed upon the nurture of the princes. It is the right of the Emperor, immediately or mediately, to appoint all public officers, from the highest to the lowest, and again to remove the same; to invest with places and titles of honor, to ennoble even the dead, and in his capacity of high-priest, to register the latter among the number of the saints considered worthy of adoration as divinities, and to whom temples are erected. No order of any of the authorities is valid before it is approved by the Emperor; his ordinances and commands, however, are unalterable and irrevocable. Among the principal tokens of imperial power belong the seals, which are annexed to all public documents and enactments of the offices of state. These seals are about eight inches square, and are cut in very fine jasper. This stone is highly esteemed by the Chinese, and no one besides the Emperor and his officers is allowed to make use of it as a signet. No person can obtain a place in the administration of the Chinese Empire who has not prepared and qualified himself for the situation by literary studies. In case the examination which is held, shows the requisite capacity, and the applicant enters into the service of the state, he receives the title of *quang* (*i. e.* overseer), translated by the Portuguese into *mandarin* (from *mandar*, a commander). The *quang* or *mandarins* are divided into nine classes of nicely graduated rank. Besides the before mentioned buttons upon the caps, the different classes wear upon the breast as badges of distinction a piece of stuff called *pud-sy*, expensively worked, and containing a motto in the midst having a reference to the office. Some mandarins in the civil service have in addition a dragon with four claws, others an eagle, a sun, &c. In like manner mandarins of the army wear representations of leopards, tigers, lions, &c. Upon the *pud-sy* of the Emperor are found his arms, a dragon with five claws on each foot, in a blue field.

The laws have banished revelry and pomp from the private life of the Chinese, but upon public occasions they are not only permitted but even enjoined. Ceremonies and testimonies of respect, which must be paid to the mandarins by the people in the streets, vary according to their rank.

No functionary goes on duty into the street without being accompanied by all his subordinate officers ; and if one of the populace forgets to render proper respect to the mandarin, or is not sufficiently quick in turning aside, he is driven out of the road by blows of bamboo-canes. (*Pl. 25, fig. 2.*) When a *zong-tu* or vice-king goes abroad his retinue consists of at least one hundred men, civil officers, soldiers, police-officers, musicians, house servants, &c., all clothed in the most expensive manner. Military mandarins, upon public occasions and when making journeys, are always on horseback, and display costly riding equipage, the bridle, bit, and stirrups being manufactured of gold and silver. Nothing, however, bears any resemblance in magnificence and splendor to the public audiences given by the Emperor, or his receptions of ambassadors from nations and princes subjected or tributary to him (*pl. 22, fig. 1*).

The first section of the Chinese code of laws, which is written for the good of the subjects in the plainest characters the language affords, bears the title "General Laws," and commences with a summary enumeration of the customary punishments. The mildest is moderate correction with a thin bamboo, which is scarcely considered a punishment by the Chinese, but merely a mild, at any rate not a degrading, admonition. More disgraceful is the carrying of the *tsha*, that is to say, a great wooden tablet, upon which the offence of the condemned is written in large characters, and which he is obliged to carry about with him for weeks and months, according to the circumstances of the case. The highest ministers, and grown sons of the Emperors, are not exempt from the punishment of blows with bamboos ; the Emperor himself being the only individual not liable to correction. Death is the severest punishment ; then follows perpetual banishment to a distance of from 2000 to 4000 miles from the capital, with one hundred blows with rods in addition. In many cases, punishment consists also of blows with bamboos upon the soles of the feet. (*Bastinado, pl. 24, fig. 3.*)

All the military forces of the Chinese Empire are under the ministry of war (*Ping-pu*), the only final authority, as soon as the Emperor has given his orders in regard to the execution of important expeditions. The command of the army is committed to the *Tong-tshing-fu*, or General Field Marshalate, the chief president of which is one of the most respected grandees of the Empire, and under whose immediate orders is the entire army. This is divided into five great bodies, each with a field-marshal and two aides-de-camp, who all reside in the capital of the Empire. The Mandchoo troops are the most important, numbering 678 companies of 100 men each ; the second division, 211 companies, comprehends the Mongols, who came into the country with the Mandchoo at the conquest of China by the latter. The third division, 270 companies, is made up of *Utsheng-Tshocha*, who, at the close of the last Chinese dynasty Ming, went over to the Mandchoo, and assisted them in taking possession of the Chinese throne. These three divisions form the Mandchoo army proper, which consists of about 116,000 men, mostly cavalry, with field artillery to the number of 400 pieces, and constitutes the nucleus of the Chinese military force. The

fourth and fifth divisions of the Chinese army consist of native Chinese, called *Lu-ki*, that is to say, troops of the green color. They comprise field troops, and city and country militia; and, except in important wars, perform almost exclusively police service. The entire military force amounts, by a moderate estimate, to 1,347,000 men. Powerful as it sounds, this host is nevertheless little to be feared, as the Chinese are poor soldiers, and even the Mandchoo and Mongol troops are no longer what they formerly were. The weapons are bows and arrows, swords, and muskets. Chinese troops are in uniform only when in service; out of service, they dress as citizens, and are engaged in civil occupations. The uniform of Chinese infantry is represented in *pl. 23, fig. 3*. It very much resembles the common dress of citizens; the spencer (*kurma*) differs, and must be of the same color with the standard to which the soldier belongs. The uniform, however, of the so-called *Tiger Guard* is entirely peculiar. It consists of a jacket, long trowsers, and a yellow cloth cap with dark brown stripes. The cap has two ends resembling ears, envelops the entire head, and its cape reaches down to the shoulders. A gaudily-colored shield of bamboo wicker-work, and a sabre, are their arms. The cavalry are mounted upon small horses, and make their attack in a rash and impetuous manner. Their saddles are very soft, and as high in front as behind, so that the rider cannot easily be thrown from his seat.

The Chinese manifest great industry and perseverance at their work, and in the rational pursuit of agriculture are distinguished in a manner altogether peculiar. Their land never lies fallow; and, as a general rule, the same acre yields three crops in the course of a year; first rice, then vetches, and lastly, wheat or other grain, or sometimes beans. The greatest care is bestowed upon the manuring of the fields. The Chinese direct, in particular, great attention to the cultivation of rice; and this branch of agriculture is pursued not only in the plains, but a certain variety of this grain is grown upon the slopes of the mountains, where a system of irrigation and trenching of the most ingenious character is employed. Pleasure and flower gardens, on the contrary, are seldom found, the soil being too expensive to the Chinese to be made use of for the gratification of luxurious tastes, in a country so densely populated. The Chinese pay also but little attention to the raising of fruits; the cultivation of the sugar-cane, the mulberry, and the tea shrub, on the other hand, is the more zealously followed. Great quantities of kitchen vegetables are likewise grown. The most flourishing tea plantations are in the province *Fo-kieen*, and the adjoining section of the province *Kiang-su*. Tea shrubs are planted in China, in part as inclosures for fields; partly, and chiefly, in particular grounds and gardens. In the third year the crop begins, and a single shrub frequently furnishes from three to four pounds of tea leaves. Three crops are gathered yearly, and each time the leaves are picked and assorted according to the different kinds. The leaves are pinched off with the nail; in doing which, injury to the branches and buds is solicitously avoided. In the preparation of *black tea*, the leaves are plucked with their pedicles, and

exposed to the sun for two hours, in large bamboo baskets placed upon a scaffold, being carefully turned from time to time. They are then carried into the workhouse, and spread out upon a hurdle for half an hour, in order to cool, after which they are placed in baskets on a scaffold. Next the leaves are worked with the flat of the hands for about ten minutes, and then taken to a hurdle again, where they remain for about half an hour. This process is repeated until they become soft, and are ready to be roasted in a cast-iron basin. The basin stands upon a round brick oven, where it is brought to a red heat. The overseer of the workshop attends to the roasting: at his left hand a man holds a basket with leaves to be roasted, and at his right hand stand two others to receive the roasted leaves in small baskets. The roasted leaves are now spread upon a table, around which men, women, and children stand and roll them together in the shape of a ball. In order to free them from their moisture, they are finally exposed to heat in a basket, upon an oven, until they are half dried. They are then again placed on a hurdle, in baskets, in order to be completely dried in the air. The leaves designed for *green tea* are gathered without their pedicles, and immediately thrown, two or three pounds at a time, into a cauldron heated to redness, where they are turned about in all directions, at first with the hands, then with small bamboo sticks. After about three minutes, they have become so flexible that they are capable of being rolled up. They are now taken from the fire, thrown into flat baskets, and swung in the air, in order to cool. The leaves are then softened by kneading with the hands, and formed into conical balls. These balls are exposed to the sun for eight or ten minutes, or are warmed slowly in a drying room. When the leaves, by means of repeated kneading, have lost the greater portion of their moisture, they are thrown a second time into the caldron heated to redness, and again studiously turned. After this, they are poured into a basket, and then rammed, fifteen or twenty pounds at a time, into a thick linen bag, four feet long and two broad, in which they are tightly pressed together. The sack is then tied up, and trodden with the feet until it becomes as hard as stone. After the lapse of a day, the leaves are taken out of the bag, put into baskets, and placed near the fire, where they remain until they are sufficiently curled, and rolled up in a spiral form. They are now packed in chests, or bamboo baskets, and allowed to stand from two to six months. The leaves are then taken out, and spread in large baskets upon hurdles, where they remain until they have become sufficiently soft to be rolled up. They are then again thrown into a hot basin (six to seven pounds at a time), where they are rolled together with both hands alternately, after which they are passed through three sieves, standing one above another, and whose holes are of different widths, in order that the leaves may be sorted according to their various sizes. For further sorting, other peculiar contrivances are employed. After this sorting, the tea is thrown once more into a heated basin, and again rolled and sorted. During this final roasting, half a tea-spoonful of a powder consisting of three parts of sulphate of lime and one part of indigo, is added to every seven pounds of tea, rolling the whole for

at least an hour, in order to give it a uniform color. (*Pl. 23, fig. 1*, The planting and preparation of tea.)

The Chinese pay the greatest attention to the rearing of cattle, the main support of agriculture, and besides the common domestic animals they possess camels. Hunting, fowling, and fishing are frequently followed by them.

Silkworm rearing is a very ancient occupation, dating as far back as the age of the Emperor *Hoang-ti*, who, according to the earliest Chinese authors, ruled when the country had just been rendered habitable and man was yet dressed in skins; but when, owing to the increase in population, skins became scarce, the use of silk for clothing was invented by a consort of the Emperor. This report from a time rich in tradition and fable contains one unquestionable truth, namely, that the production of silk had its origin in China. The provinces which have obtained the greatest celebrity in raising silkworms, and in the silk manufacture, are *Tshe-kiang*, *Kiang-su*, and *Ugan-hoei*; here silk stuffs are fabricated, the fineness, softness, and lustre of which European manufacturers have not yet attained, and which are distinguished also for their great variety. (*Fig. 2*, Sorting of silkworm cocoons in China.)

Cotton manufactures are quite as noted, of which we will mention only the well known nankeen. In the fabrication of porcelain, called in China *Ze-ki*, the Chinese long since arrived at a perfection not attained in Europe until within the last few years. Latterly, however, the Europeans have excelled the workmen of China in this branch of art. The Chinese, moreover, have made extraordinary progress in the manufacture of lacquered and varnished work, in dyeing and embroidery, in the fabrication of black color (known as India ink), and in paper making; but especially in fine carving in wood and ivory. In many of these branches they excel the Europeans.

With respect to the sciences, we only mention particularly the fact that imperial schools of medicine formerly existed; at present, however, the most celebrated physicians are those whose ancestors belonged to the same profession, and whose knowledge has been transmitted from father to son. The medicines, which are prepared by the physicians themselves, there being no apothecaries in China, are mostly of a very simple nature; and affusion with cold water, as well as cauterizing with red-hot pins, or fire buttons (*moxa*), are remedies greatly esteemed. Bleeding, emetics, clysters, and purgatives, are not in use among them, and the main cure is a strict diet. There are plenty of travelling quacks (*pl. 25, fig. 3*), who perform all sorts of experiments before spectators, particularly juggleries with venomous snakes.

Among the holidays kept by the Chinese, new year and the feast of lanterns are the most important. By the commencement of the new year, they understand the space of time included between the end of the twelfth and about the twenty-first day of the first month in the following year. During this period, all work, even the post-office business, is discontinued, and all transactions of the administration of the state cease, which is called

the locking up of the seals, because the coffers, in which the official seals of every authority are kept, are then closed with many ceremonies. This celebration continues for a month, during which one festival follows close upon another. The last days of the year, especially, are celebrated with great pomp, and congratulations and presents are offered.

The festival of lanterns falls in the middle of the first month, commencing on the evening of the thirteenth day, and continuing until the seventeenth, during which time all China is illuminated. Fireworks, in the manufacture of which the Chinese display their great skill in the pyrotechnic art, are added to the universal illumination of the streets and interiors of buildings by means of gorgeous lanterns.

On the fifth day of the fifth month, a great festival takes place, which is celebrated on the water, and consists of games, banquets, and aquatic combats in dragon boats.

The principal diversions are plays, puppet shows, and sleight-of-hand performances. There are no stationary theatres in China, except in Peking, where there are six in one street, and in a few other great cities; even the court being satisfied with itinerant companies. (*Pl. 24, fig. 2*, Chinese theatre.) The pieces are commonly taken from Chinese history, and the dialogue is generally maintained in a kind of recitative. No attention is paid to regularity, nor to unity of place and time. Female parts are played by eunuchs. Ghosts, animals, ghastly scenes of bodily punishment, &c., are usually not wanting in the scenes. Pantomimes are also performed. The conjurors execute very surprising tricks; and the feats of the rope-dancers, jugglers (*fig. 1*), and caperers, are said to excel those of the most skilful Europeans. The puppet manager, under a curtain of blue and white stuff, which reaches to the ankles, plays a kind of comedy with his little figures. A small box upon his head represents the theatre. Other puppet theatres are seen, however, the player standing beside the box, upon which the figures are placed and moved by means of strings, the orchestra consisting of a single performer, blowing a bamboo flute, with one foot beating a kettle-drum, and with the other striking cymbals (*pl. 25, fig. 1*). The *bonzes* also (*pl. 22, fig. 5*), a species of mendicant monks, priests of *Fo*, are frequently obliged to have recourse to sleight-of-hand tricks, in order to obtain beggarly alms. They go from door to door, and sing a kind of monotonous song, accompanied by feeble blows upon a hollow pyriform piece of wood.

In conclusion, we will make a brief statement in regard to the Tibetans and Coreans, whom we have named among the people of China.

The Tibetans, or *Thibetans*, are the inhabitants of the high, cold tableland of the interior of Asia, bounded on the south by the Himalaya, and on the north by the mountain chain of *Kuen-lin*, and watered by the Indus and the *Yaru-zangbo-tshu*. They call themselves *Bod-gshi* and *Bod-ba*, and their country *Bod*. Besides the region mentioned above, the Tibetans inhabit the southern valleys of the south-eastern Himalaya, in the province Bhotan, or Bootan. Under the name of *Bootiyahs*, they live also in the Himalaya of Nepal, and in the British part of the same

mountains ; and, under entirely different names, in the western and southern provinces of China. The Tibetans have broad, flat faces, flat noses, and eyes with narrow apertures ; but besides these Mongolian, they display also Caucasian features, that especially remind observers of the Semitic physiognomy. They are well built in figure, strong, and tolerably large, but frequently suffer from the goitre, in consequence of the mountainous character of their country. In places where they are not corrupted by other nations, they are described as peaceable, mild, honest, and frank. The land is not productive, and the population therefore very small. Besides agriculture, the rearing of cattle forms a main business of the Tibetans. They raise horses and cattle, but pay particular attention to sheep and goats ; and their goats are of the well known Cashmere breed, from the wool of which the expensive Cashmere shawls are woven. The industry of the Tibetans is confined principally to the weaving of wool and silk, and the manufacturing of articles of gold and silver, carved woodwork, sculpture, and turned wares. Their turned wooden vessels are, in particular, greatly esteemed. The houses of the Tibetans are built in a massive manner, of stones rough from the quarry. They are very large, and frequently several stories high, and at times capable of affording room to some hundreds of people. The dress consists of a coat, which in summer is manufactured of woollen stuff, in winter of sheepskin or fox furs, or also of thick felted wool. On the head they wear a fur cap, ornamented with teeth of wild boars, or pieces of tortoise-shell ; and with the rich, with pearls. The latter sometimes wear silk clothes and handsome furs ; and females, a jerkin with short sleeves and an apron of tammy or silk, and cover the neck with a small handkerchief. Both sexes adorn themselves with rings, armlets, and coral necklaces, and wear boots, often of very costly description ; but although thus paying much attention to ornament, they are nevertheless said to be very uncleanly, and to wash themselves but seldom.

Their language is very harsh, but rich in combinations of rough consonants, and is spoken in a number of dialects. (*Pl. 22, fig. 9, a Tibetan.*)

The *Coreans* inhabit the peninsula of Corea, and are usually called in the Chinese *Kao-li*, in the Japanese language *Koo-rai*. They spring from a Central-Asiatic nation, long since extinct, the *Sianpis* ; who inhabited the *Ghirin* mountains in Mongolia, north-west of Peking. Their euphonious language is at present interspersed with many Chinese and Japanese words. The Coreans are taller than the Chinese and Japanese ; stronger, more sinewy, and vigorous ; more symmetrically formed, and at the same time robust and agile. The countenance is Mongolian, but approaches the Caucasian. The Corean is serious, tranquil, frank ; his gait exhibits firmness, his deportment more self-dependence and energy than is the case with the Japanese and Chinese ; but in refinement of manners he is inferior to both. He is at the same time uncleanly, and rather intemperate in eating and drinking ; also, according to travellers, very much addicted to lying, cheating, and stealing. He is described, likewise, as superstitious and effeminate, and fond of music and dancing.

The dress consists of embroidered and colored robes and short sleeved jackets, high square fur caps, or round broad-brimmed hats, and boots made of leather, cotton, or silk. Men of distinction prefer purple silk, and like to have gold and silver embroidery on their clothes. The dress of the women is ornamented with borders and laces.

The King of Corea pays tribute to the Chinese as well as the Japanese government, but is nevertheless absolute lord in his own country. Farming, the raising of hemp, cotton and tobacco, silkworms and cattle, are the employments of the people. Rice is the principal food, and tobacco smoking is general among both sexes from childhood. The houses of men of rank are very showy, those of the lower classes small; in the cities they are constructed of bricks, in the country of framework, the manner of building being very similar to that in use by the Chinese. (*Fig. 7, a Corean.*)

The Siamese.

The Siams, or *Siamese*, have large faces, with broad foreheads, covered at the sides by the hair; great, broad, prominent cheekbones, and occiputs so flat that from the crown to the nape they form almost a straight line. Their limbs are large, the muscles lax. The complexion is blackish-brown; the teeth are stained black; the nails, especially the one on the forefinger, are worn very long; and the lips are very red in consequence of frequent chewing of betel. Their dress is of a plain character. The upper part of the body is entirely bare, or covered with a cloth merely. A similar one is wrapped around the hips and thighs. Only persons of consequence wear clothes, usually of a red color. Men dye their feet and legs as far up as the calves of a blue color. The head is usually uncovered; when travelling, a hat braided of rushes and palm leaves is worn for protection against the sun. The king, and officers of distinction, only, habitually wear pyramidal caps ornamented with gold and jewels. Priests cover their bodies carefully. The Siamese are neat in their habits, bathe frequently, and anoint themselves with perfumed waters and oils. They are distinguished also for temperance in eating and drinking. The principal food is rice, but fruits, eggs, poultry, and fish are also frequently taken; more rarely the flesh of mammiferous animals. Believing in the doctrine of a migration of souls, *i. e.* that the souls of the dead enter into the innoxious animals, the Siamese kill only wild and dangerous beasts. They drink water and buffalo's milk; men of rank indulge in arrack and wine. Their respect for the dead, as well as their love for their children, is great. The corpses of men of consequence are burnt; those of the poor are committed to the water. The Siamese not unfrequently knead the ashes of the dead into paste, from which they mould, with many ceremonies, an image of Buddha, which is sometimes gilded and taken into a temple, or preserved by the survivors as a domestic idol.

The Siamese are expert in dissimulation and lying, and they are as

fawning towards their superiors as they are harsh and haughty in behavior towards their inferiors. Thefts are rare, probably on account of the severity of the laws. The Siamese have a language of their own, which is written and read from the left to the right. The *Pali* tongue is the language of religion, and known only to the priests. Buddha, whom they adore together with many other divinities, is called by them *Sommona-Kadom*. The sovereign is a despot, and the subjects are his slaves, of whose lives and property he has the power of disposing at will.

The Japanese.

The Japanese are in general of medium size, and brownish-yellow color, often passing into livid. Women of rank, who are less exposed to the open air and sun, are alone found to be as fair as European women. The eyes are sunken, with narrow apertures, but beautifully black; and in the female sex have a very gentle expression, and indicate inherent good nature. The eyebrows are very high, and from the corners of the eyes numerous wrinkles run out towards the temples. The nose is short and straight; the head generally large, the neck on the contrary short; and the rich black hair glistens as if oiled. Men shave their heads bare, excepting the hair on the hinder part and top of the head, which is united in a tuft upon the crown. Their beards are weak. Women permit their hair to grow long, bind it together upon the head, and secure it with several long pins. Perfect beauties are found among the females of Japan, but all are small of stature. Concerning the disposition of the Japanese it cannot be denied that they have good mental faculties, but they are deceitful and cringing towards their superiors; proud, haughty, resolute, reckless of their own lives, and consequently fearless of death. Their ordinary deportment is marked by extreme courtesy. They greet each other either by bending one knee, or in case they wish to salute in a more submissive manner, or to offer great honor to any one, they kneel down and incline the face to the ground, which, however, is done only within doors. The Japanese are very revengeful, but also very faithful in friendship, and very jealous of their honor. They deserve credit also for being temperate in eating and drinking, cleanly, industrious, and economical, honest and true; but, like the Chinese, they think themselves much above all other nations in every respect. They are usually found singing at their work, and are almost always lively and cheerful. Few nations are so fond of show as the Japanese. Their dress is subject to no changes of fashion, it has remained the same for centuries. Their long, full, silk or woollen coat, with wide sleeves, resembles the Turkish morning-gown. The men wear it of a plain color; the women of a material ornamented with large flowers, and not so wide. Men wear from three to four, women, out of vanity or for defence against the cold, ten, and sometimes even from thirty to fifty such coats, one over the other, as these garments are very light. Over them a kind of cloak is sometimes worn. Trowsers are in use only

for state dress. The feet are protected by sandals, with or without stockings. The usual color of the clothes is black, white being the mourning color with the Japanese. Their hats are of straw, wood, or leather, painted and lacquered, with small crowns but large brims.

Mining, agriculture, horticulture, fishing, and rearing silkworms, are much more attended to in Japan than hunting and cattle-breeding. Their silk fabrics are by far the best in commerce. The Japanese are very skilful also in lacquered work, as well as in making hardware, and their porcelain is better and more durable than that manufactured by the Chinese. In medical science they are likewise more advanced than the Chinese; their navigation, however, is still very imperfect. The use of the compass is nevertheless understood by them, the circle being divided into twelve parts (winds). In astronomy, they are still far behind; their land and sea charts, however, are not bad, being perhaps copies of European ones. Foreign commerce rests entirely in the hands of the Chinese and Dutch. It is no longer of very great importance, as but few ships are permitted to come to Japan. Before the extirpation of Christianity, there were quite a number of religions and religious sects in Japan; at present there are only four, according to others seven, prevailing creeds. Some worship the heavenly bodies, others still cling to the ancient faith of the country, the *Sinto* religion, the head of which is called *Kin-Reh*, by the Europeans *Dairi*, who at the same time is the spiritual chief of all Japan. The *Kubo* or *Ziogoen* is in possession of the temporal power, and is little restrained by the *Dairi*, who is his apparent superior. The state or crown property constitutes more than half the empire; the *Kubo* receives besides considerable presents from the hereditary princes of the country; and as the taxes and duties swell his receipts still more, the *Kubo* may be considered as one of the richest sovereigns in the world. The army is maintained, for the greater part, by the hereditary princes. Japanese laws either depend upon the orders of the Emperors or follow ancient usages. The legal code is very short; there are few magistrates, and the penal statutes are very severe, but are as rigidly enforced towards the higher as towards the lower classes. The police are vigilant, and endeavor strictly to maintain public order. All the streets of the cities have officers of their own, who take care that the regulations are properly observed; these again have others over them.

The Japanese inhabit the Islands of *Nipon*, *Sikok*, *Kiu-siu*, and *Lieu-Kieu* or *Riukiu*. The name of this nation is of Chinese origin, and is made by the Europeans from *Shi-pan*, *i. e.* "sun-rise," which in Southern China is pronounced *ja-*, or *jat-pan*. The Japanese pronounce it *Nifon* or *Nipon*; hence the Europeans denominated the largest island *Nipon*, although the name belongs properly to the whole group.

Between the Japanese language and those of the neighboring Kurile and Mandchoo-Tungusian tribes there is no similarity whatever. Any resemblance manifested to the Chinese and Corean has unquestionably arisen in later times, when the Japanese aborigines were civilized by Chinese colonies, and received the Buddhist religion by way of Corea. There can be

no doubt that aborigines inhabited Japan since the earliest times ; and it must be pronounced very unlikely that the population of Japan came from the continent of Asia.

Pl. 22, fig. 10, represents a Japanese lady ; *fig. 11*, a Japanese man of rank in the act of drawing on his fine gloves ; *fig. 12*, one of the same class in gala dress ; *fig. 13*, a Japanese fisherman's family ; and *fig. 14*, parasol and sign-bearers. *Fig. 8* represents an inhabitant of the island of Lieu-Kieu, with a blue coat reaching to the knee, a red girdle suspending the pipe and tobacco-pouch, sandals attached to the bare feet, and in his hand a feather fan.

THE NATIONS OF AFRICA.

Africa is the hottest part of the world, owing to its position, shape, and the conformation of its soil ; and although a fourth part lies within the temperate zone, it has, with the exception of the northern declivity of the Atlas, the hot climate of the rest of the continent, in consequence of the influence of the whole. The eastern coast is cooler than the western, only by reason of the trade winds, prevailing almost all over Africa. In the interior, hot days alternate with cool nights, often even with night frosts, a change in the highest degree pernicious to the human frame. Still more injurious is the alternation of the hot and rainy seasons, chiefly on the west and east coasts ; having, it is true, the more beneficial effect upon nature, which, as soon as the rain, preceded by the most terrible heats, ceases, shows an indescribable luxuriance. Everything has obtained new life ; it is the joyful season of hot Africa. The fruitful season, however, does not long continue ; the heat increases, the rivers dry up, vegetation, with the exception of the small succulent plants, perishes, until the time of rich blessings again begins. The greatest fertility is observed on the coasts of Africa, where the large rivers and the heats exercise a joint influence.

Africa is not densely populated. In the southern part of Soudan (Nigritia) live the dusky Negro race : in the north of the same country the light colored Berbers are found as an original stock ; whom, however, later immigrants and conquerors, as Moors, Jews, and Arabs, have driven into the mountains and oases. In the south of Africa dwell the Hottentots and Bushmen ; in the north-east the inhabitants of Abyssinia ; and round about on the coast Europeans have settled.

The Moors.

The name *Moors* originated in the eighth century, when the Arabs of Africa invaded southern Europe, as they were confounded with the ancient Moors of Mauritania. The name Moor was then given, not only to all non-nomadic Arabs, but even to all Mohammedans of India, little as they

have in common with the Moors proper. It was applied particularly to the settled Arabs of Moghrib (West Africa), of whom it is known that they immigrated as nomads, and in the course of time took possession of fixed abodes among the Berbers, the aborigines of Moghrib, intermingling with them and other nations, but nevertheless securing to themselves the supremacy. Gräberg de Hemsö had occasion to observe these true Moors for a long time, in different countries of Africa. He describes them as rather slender, well formed, of medium size, and appearing stouter than they actually are, only on account of their full dress. It is said, however, that at a more advanced age, men as well as women, in consequence of their inactive mode of life and want of exercise, become rather corpulent. Their eyes and teeth are handsome; the complexion, however, varies greatly, owing to the different colors of the mothers, who are of various tribes, especially the blacks of Soudan. The more the color approaches to black, the handsomer and of more decided character are the men. The women, who, when young, are well formed and pretty, color their eyelids and eyelashes with antimony, and paint their fingers and toes, faces, and other parts of the body. The dress of the Moors consists of a shirt with wide sleeves, and of very wide trowsers of white linen, over which they wear the *kaftan*, usually of bright yellow color or sky-blue, with short sleeves buttoned at the wrist, and fastened by many with a colored sash. Over this is displayed the *haick*, or cloak, of reddish cotton or silk, which is worn in the manner of a Roman toga. At times a garment of blue cloth with a cowl, called *burnous* by them, is added, or a lighter undervest (*sool-ham*), usually of white casimere. The covering for the head consists of a white cap, to which is added, by such as have made a pilgrimage to Mecca, a turban of white muslin. The feet are covered with yellow leather shoes, or half boots. Women also wear the *haick*; indeed it is frequently their only article of dress, and often so fine as to be almost transparent. Those in easier circumstances wear a wide and handsome chemise of fine linen embroidered at the bosom with gold, and over it an ample kaftan, usually of cloth, or velvet worked with gold. Strips of a silk or gold-worked veil (*a'bour*) are wrapped around the head, and fastened at the neck, where its knots fall with the braided hair upon the girdle. Sometimes they add a riband ornamented with gold coins and pearls (*A'zaba*, or *Sfifa*), encompassing the forehead like a diadem. In the upper part of the ear they wear a small ring (*amara*) and in the lobe of the ear a larger weighty one (*khersi*, *khorsa*), both ornamented with costly stones; around the neck, rows of gold and silver coins with jewels, called *tezra*; on the wrists, thick gold or silver bracelets (*deblis*, *mukis*). Such bandeaux are worn on the legs also, the lower being called *khelkal*, that around the knee *ruccus*. Over the kaftan is thrown a light linen garment (*mon-oria*), which is fastened around the body, either by a girdle of crimson velvet embroidered with gold, and with a gold or silver buckle, or simply with a twisted sash. They wear red slippers; but like the men, no stockings. The lower classes and the poor wear, as their only garment, a kind of sack of coarse linen, called *dshelabia*, with a hole at the top for the head, and openings

at the sides, through which to thrust the arms. (*Pl.* 26, *fig.* 2, Moor of rank ; *fig.* 3, Moorish merchant ; *fig.* 4, Arab chief of Algiers ; *fig.* 6, Negro female slave of that place.)

Among the Moors, as amongst all Mohammedans, bathing is, as it were, a religious act, which must never be omitted ; and the public baths are with them also places of meeting for social conversation (*fig.* 1, Moorish bath in Algiers). The usual and best article of food of the Moors is the *sucfu* or *cuscusu*, which consists of a fine paste of coriander seed, meat, broth, butter, eggs, saffron, cayenne pepper, &c., and is eaten with the fingers out of a large bowl. Coffee is seldom used, but tea is partaken of several times in the day. Instead of tobacco, they frequently smoke a kind of hemp (*khashis-cha*), or the seeds of a plant called *kif*.

The disposition of the Moors is described by Gräberg de Hemsö in these words : "We, who ourselves lived and had intercourse for twelve years with the Moors of several Atlantic countries, and have attentively studied their disposition, can conscientiously declare that everything mean and despicable in the extreme, to be found in the human heart, constitutes the general disposition of these Africans. They are, and will be for many years to come, the same barbarians they were in the times of Sallust and Procopius ; fickle, faithless, lying, cruel, incapable of being held in check by fear or acts of kindness. Their predominant passions are sensual love, revenge, ambition, and covetousness. Of a cruel, barbarous, imperious, unfeeling disposition, the idea of kindness and sympathy is entirely foreign to them. Haughty, harsh, and arrogant to their inferiors, they are servile and submissive towards their superiors ; and to the powerful, of the basest, most slavish deportment. Their covetousness is incredible, and more than makes good the adage, 'a Moor would resign an eye, in order to put in its place a gold coin.' They scrape together riches, feigning poverty at the same time. In addition, they are fanatical, hypocritical, and cruel ; detest all foreigners, persecute the Christians, and oppress the Jews in the most unjust manner ; but especially hate the Turks, because they consider them heretics and propagandists, and the Roman Catholics, because they esteem them idolaters. When sustaining bodily chastisement, pain, or suffering, they display, in general, the cold indifference of savages." From the catalogue of sins of the Moors we have selected only the most important, since Gräberg de Hemsö enumerates many more.

Females pass lives of entire seclusion, and, like their husbands, believe that God created woman only for sensual pleasure, and for the propagation of the human species. Hence women are satisfied to be shut up in their harems, and an exposure to the eyes of a stranger by their consorts would be considered an offence.

Our readers have already become acquainted with the Bedouins, in reading the portion of this treatise devoted to Asia, and hence we only observe that on *pl.* 27, *figs.* 4 and 5, are represented Arabian caravans ; at *figs.* 1—3, Egyptian Fellahs and Bedouins, with their tents, two of the Bedouins being in the act of performing a martial dance.

The Abyssinians.

The Abyssinians (*Habbesh*, *Habessinians*) inhabit the elevated country of East Africa. They are a Semitic stock, who call themselves by preference *Agazians*, or frequently also *Ijopjawan* (Ethiopians), since they have settled among the true Ethiopians. They spring from the Cushites of Arabia, and are called *Cush* in the Bible, like the people from which they are derived. Even before the time of Moses they must have passed over the narrow arm of the Red Sea, and taken possession of the territory which subsequently constituted the Kingdom of Tigre. The word "*Habbesh*" signifies properly "a mixed people," and the inhabitants of the East African highlands justify the denomination by their actual mixed description. The majority of the population are handsomely formed, and of the Caucasian race, with the physiognomy of the nomads of Arabia. The face is oval; the nose finely sharpened; the mouth well proportioned, with lips properly formed, and by no means exuberant; sparkling eyes and well-set teeth; hair somewhat curled, but also straight. They are of medium size. The greater portion of the inhabitants of the high mountains of *Simen* and of the plains around Lake *Zana*, as well as the *Felashah*, or Jews, the heathen *Gamants* and the *Agows*, belong to the same stock, in spite of the difference in their languages and dialects. A second division of the inhabitants of Abyssinia have a less sharpened and pointed, and somewhat aquiline nose; thick lips; eyes dull, with narrow apertures; and very crisply curled, thick, almost woolly hair. This division includes a portion of the inhabitants of the Abyssinian coast, of the provinces of *Hamases* and the other districts along the northern confines of Abyssinia. Rüppel, the author followed by us in our characteristics of the Abyssinians, mentions a third, the *Galla*, including the *Shoho*. The unprepossessing features of the latter tribe are found quite frequently among the inhabitants of the province of Tigre, and among the soldiery of most other districts. Negro physiognomies occur only among the *Shangalla* slaves imported hither from the west, and their cross-breed children. With the exception of those who are entirely black, the complexion of the remaining inhabitants of Abyssinia varies greatly, from brownish yellow to dusky blackish-brown.

The Abyssinians are described as being quite as corrupt as the Moors. Travellers depict their moral condition in the darkest colors; the ideas of truth and faith, and every other virtue, may be called unknown to them; their disposition is made up of all the vices of which the human heart is at all capable, the Christian inhabitants being in every respect as bad as the others. They have no conception of the sanctity of the marriage tie; and, consequently, immorality pervades all orders of society, and is the more dangerous for the strict observance of apparent decorum. A few good qualities are perceptible in spite of the general corruption, especially the hospitality, protection, and security afforded to strangers.

Abyssinia shows not a trace of any regular form of government. The entire country has fallen into anarchy, in which the strongest and most

crafty holds the power until he is dispossessed by another. Rüppel says: "The history of the last sixty years shows a complete political dissolution of the country, and relates merely to the various chieftains who have succeeded in attaining unlimited power in the several provinces, that existed as separate states independent of each other, supplanting their rivals by stratagem or boldness; and falling in their turn by the treachery of their confederates. The natural consequence of such rivalry was continual civil wars, and subsequent general impoverishment. Landed property has hardly any value, agriculture is almost entirely neglected, and the rearing of cattle is very sensibly decreasing. On account of the great insecurity, traffic is often entirely suspended. Most of the habitations are small, filthy, thatched cots, surrounded by a high thorn hedge for the protection of the domestic animals at night. A few of the houses only have a circular stone wall, usually four feet in height, as a foundation, and a solid, conical, thatched roof, resting in the middle upon a main pillar, and supported besides by a circular row of wooden props. Daylight is admitted only through the door. In *Baharnegash*, in the Kingdom of Tigre, the houses have flat roofs. Some Abyssinians still live in caverns, as was customary in ancient times; or they erect walls at right angles on the steep declivities of the hills, and place thereon a turf roof in such a manner as to make it agree with the slope of the hill, and to give the whole the appearance of a cavern. There are very few towns, and these consist mostly of groups of conical thatched huts.

The dress of the Abyssinians is simple, and consists partly of skins, in part of cotton stuffs. Short trowsers, usually wide, and a cloth thrown around the shoulders, generally constitute the entire dress. Men of rank, however, wear a shirt of white Indian stuff, with tight sleeves, and very fine colored silk embroidery, and over it several cotton robes. Their ornaments for the arms, neck, and feet, are of silver. Red slippers are imported from Egypt; black ones, however, are manufactured in the country. Women are enveloped to the chin; and the sleeves fall down to the tips of the fingers. The weapons of the men are chiefly the shield and lance. A curved knife sixteen inches in length, and something under two in breadth, is placed in a cotton girdle, and upon the right side. In Abyssinia, moreover, as in all other countries, small variations in the dress and habitations are observed. (*Pl.* 28, *fig.* 1, Abyssinian men and women; *fig.* 2, travellers.)

The Fezzanians and Bisherin.

The Fezzanians inhabit the oasis of *Fezzan* or *Fessan*, and differ as well in complexion as in physiognomy, and are, therefore, probably a mixture of several nations. The inhabitants of the north are white, like the Arabs; at *Morzouk*, however, a change of color begins, and a transition is perceived from this light hue to the darkness of mulattoes, and from the latter to the black of the Fezzanians living to the south, who remind observers of

the *Tuarik* branch of the *Berbers*. Horneman considers the inhabitants of the province Shati, as the real or main stock of the Fezzanians. They are of medium growth, dusky brown, with short black hair, tolerably regular features, and nose less flattened than is the case with the negroes. In general the figure of the men is not handsome; the women are strikingly ugly, and both sexes are destitute of vigor and courage. They are fond of singing and music; and though they are naturally cheerful, obliging, and hospitable, the oppression of the government has made them inhospitable, covetous, faithless, and malicious. They have adopted the Arabic language, but speak it with the rough and harsh Moghrib dialect. They are nominally Mohammedans, but mingle all kinds of heathenish ideas with their religion. Their chief employment is commerce; and Morzouk, the metropolis of the country, is the rallying point and market for the caravans that keep up the trade of Kahira (Cairo), Benghafi, and Tripoli, with Soudan. A few handicrafts, agriculture, and horticulture, are also pursued in Fezzan.

The Fezzanian dress consists of a coarse linen or cotton shirt, trowsers of the same material, and sandals of camel's skin. In the street a woollen covering, called *abben* or *dsherid*, is sometimes worn like a cloak. A turban and yellow slippers are sometimes put on on Fridays. Women have the fronts of their chemises embroidered, and consider their head-dress and the rings on the arms and feet their chief ornaments. On the feet they always wear red slippers. The houses, built of sun-dried bricks, are low and very uncomfortable.

The *Bisherin* (Biscarijin) live in the mountains that range along the Red Sea, north of Abyssinia, east of the *Barabras* and northwest of *Massowa*, almost the whole distance up to Suez. They seem to be the descendants of the *Bega* or *Bedsha*, who were a powerful nation in the middle ages, controlling the commerce with the whole world from both sides of the Red Sea, and who in still earlier times appear to have ruled from the Island of Meroë over the entire valley of the Nile as far as Assouan. The *Bisherin* are consequently descendants from the true Ethiopians of flourishing Meroë. They are divided into three sections: the true *Bisherin*, the *Hadharebe* or *Adareb*, and the *Ababdeh*. They speak, however, the same language; and are very similar in physiognomy, as well as in their entire exterior, to the *Barabras* of the Nile valley, and in part to the inhabitants of Abyssinia. Their color is very dark brown, almost black, but the face does not show the negro type. The nation is rapacious and warlike, and the numerous small, isolated tribes, are always at enmity and war with each other.

The Inhabitants of Egypt.

The principal divisions of the population of Egypt are the Copts, Arabs, and Turks, besides Jews, &c. The Turks constitute the smallest portion, but have pre-eminence as rulers; the Arabs are the most numerous, the Copts the most ancient tribe. The Arabs are either farmers (Fellahs)

or artisans ; and the numerous Arabic nomadic tribes, or Bedouins, rove through the wide expanse of the desert. They were formerly dangerous robbers in the peopled districts of Egypt, but have at present been made nearly harmless by the ruler of the country.

There may still live scattered through the whole country about 150,000 *Copts*. They are of medium size ; stout ; of dusky yellowish-brown complexion ; with black hair, depressed nose, thick lips, and black, prominent, but dull eyes. They have a language of their own, but usually speak the Arabic ; they are sensible, prudent, grave, persevering, and are employed by the Turks as writers, tax collectors, day laborers, &c. Copts live also in Nubia, Abyssinia, and Cyprus, &c. Their religion is the Greek Catholic, according to the principles of Eutychius. The Moslems constitute the majority of the inhabitants of Egypt. They are descendants of various Arabic tribes and families, who have established themselves at different periods in this country ; but through intermixture with Copts and other stocks, as well as by reason of the manners prevailing in Egypt, the Arabic character has been in a great measure obliterated. They are of medium size, and mostly well proportioned ; the men muscular and strong, the women beautifully formed. The skin is of a very clear yellow, and soft. Among the inhabitants of Central Egypt, however, it is of a more brownish yellow ; in the southern provinces dusky bronze-colored, or brown ; and towards Nubia, even almost black. The face is mostly handsome, oval, moderately large, yet prominent ; the black, brilliant eyes lie deep in their sockets ; the nose is straight and somewhat thick ; the mouth well formed, with rather thick lips ; the teeth exquisitely beautiful ; the beard usually black, curly, but rather thin. The dress is that ordinarily worn by Mohammedans. Men who do not belong to the poorest classes wear long trowsers, and a long, full coat (shirt) of linen, calico, or woollen fabric, mostly blue or brown, which is open from the throat to the middle of the body, and sometimes fastened by a white or red woollen girdle. The turban is mostly a white, red, or yellow shawl, or a piece of coarse calico or muslin, wound around a white or red felt cap. The trowsers are wide. Many Egyptians are so poor, however, that they only wear a blue or brown coat, and neither trowsers nor turban. In cold weather cloaks are worn. The shoes are of red or yellow leather, or sheepskin. All Egyptians shave off the hair of the head, with the exception of a small tuft upon the crown. The women of the lower classes wear long trowsers, and over these a white or blue chemise with long wide sleeves, a simple handkerchief being the only head-dress. They wear their hair in pendent braids, ornamented with common metal, and pierce the lobes of their ears, and sometimes their noses, to admit rings. They envelope themselves in a large veil, covering the figure and face, except the eyes and a small portion of the forehead, which is much disfigured by black and blue markings. Among females of distinction the style of dress much resembles that of the men, only it is much finer and more showy, and over the chemise a light satin garment is worn. When going abroad, a cloak and a long black silk veil are thrown over them ; the head-dress is varied.

In eating and drinking the Egyptians are temperate, and the meals of the rich and eminent are as simple as those of the poor. Much attention is paid to the cleanliness of the person, especially by the women. Superstition and sensuality, on the other hand, prevail everywhere. The Egyptians are described also as covetous, hypocritical, treacherous, thievish, cowardly, and lazy. On the whole, their customs and usages resemble those of the Osmanlis. (*Pl. 27, figs. 1 and 3, Egyptian Fellahs and Bedouins; fig. 2, dances and tents of the same; figs. 4 and 5, Arabian caravan in Egypt; pl. 13, fig. 1, m, head-dress of a Coptish patriarch; n, of a Coptish priest; o, of an Egyptian; p, of an Egyptian camel driver; d, of the people of Cairo. Pl. 26, fig. 7, woman of quality of Cairo; pl. 27, fig. 6, a wedding at Cairo.*)

The Berbers.

The Berbers, who call themselves, however, *Amazirgh*, that is to say, "Noble," "Free," are the true descendants of the most ancient inhabitants of Mauritania, Numidia, and Libya, or Moghrib (West), the name applied by the Arabs to northern Africa. Their territory extends from the high west bank of the Nile, and the range of oases running along the west side of Egypt, to the coast of the Atlantic Ocean; and from the shore of the Mediterranean Sea and the heights of the Atlas Mountains to the southern border of the Great Desert. They belong to the Semitic stock, but are divided into numerous tribes with different dialects: 1. *Tamazirgt*, including *Berbers* or *Amazirghs* proper, *Shelloochees* or *Shillooks*; 2. *Showi*, i. e. the Berbers of *Algiers* and *Tunis*, also called *Kabyles* and *Zuaves*; 3. the inhabitants of *Wadreag* and *Wurgela*, or *Wagela*, who speak the *Ezegiah* dialect; 4. the *Beni-Mozab*, including the Berber hordes of *Mozabis*, *Bisearies*, *Wadreagans*, and *Wurgelans*, dwelling within the confines of ancient *Gatulia*, and intermixed with Bedouin Arabs; 5. the *Tuariks*, inhabitants of the great Desert of Sahara, who speak the *Tergia* dialect.

The Negroes.

The Ethiopian stock (Negro race) live in the districts extending from the southern edge of the Desert of Sahara to the Cape of Good Hope; and thus, properly speaking, inhabit the whole of central and southern Africa. They exhibit many different shadings, as well in external form as in habits. The physical attributes among the African nations, according to Prichard, have an evident relation to their moral and social condition, and to the different degrees of barbarism or civilization in which they live. Tribes in which the Negro type is developed in a very high degree, are uniformly in the lowest grade of human society; they are either ferocious savages, or present themselves to us as stupid, sensual, and indo-

lent creatures, scarcely elevated above animal life, as for instance, the *Papels*, *Bullons*, and other rude hordes, upon the coast of West Guinea, and many tribes on the Slave Coast and the Bay of Benin, where the slave trade has been and is still carried on to the greatest extent, exercising its pernicious influence. On the other hand, wherever we hear of a negro state whose inhabitants have made considerable advances in their social condition, we invariably find that their physical character differs materially from the distinctly stamped Negro type. The *Ashantees*, *Soulimas*, and *Dahomians*, may serve as instances of this. The negroes of *Gooba* and *Houssa*, where a considerable degree of civilization has existed for a long time, are perhaps the handsomest race of true Negroes upon the continent, rivalled only by the *Joloffes*. The latter have been a comparatively civilized people since the time of their first discovery by the Portuguese.

Monotheism has gained but little ground among the Negroes. A large portion still entertain the rudest conceptions of religious matters; one third has become converted by the Moors to Mohammedanism. Islamism, though much mutilated, has been naturalized in the whole of central Africa; there the *Foolahs* and *Mandingoes* are the most zealous in religion, and at present are offering great obstacles to the propagation of Christianity from the coast. The only spot upon which the Christian faith has planted a firm foot is in South Africa, among the tribe of *Beshuans*, into whose highlands Islamism has not penetrated.

In sketching the principal Negro tribes, we begin with those settled in the west, upon the highlands of Soudan, where the Foolahs and the Mandingoes are the most powerful tribes.

The *Foolahs* inhabit a wide space, more than 700,000 square miles, extending from near the mouth of the Senegal, on the Atlantic coast, and Senegambia in the west, to the kingdom of Bornou and Mandara in the east, and from the desert of Sahara in the north to the mountains of Guinea or Kong in the south. The Foolahs are called also *Foolehs*, *Fulbies*, *Fellanies*, *Fallatahs*, *Fellatahs*, *Peuls*, &c., names that belong properly speaking to different tribes, associated, however, into one nation, by means of a language common to all. In Senegambia and the mountainous country back of Sierra Leone, the Foulahs have formed four principal states, *Fouta-Toro*, *Fouta-Bondon*, *Fouta-Jallon*, *Foulahdoñ*. The four are governed by an elective chief, bearing the title of *Almamy* (*El Imam*), and who may be considered as the president of an oligarchical council. In other Negro countries into which these nomadic tribes have penetrated, they pay tribute to the princes for the land which they occupy. The Foulahs differ, however, so much from the true Negroes, that many travellers are inclined to arrange them as a particular race. In turns, their complexion has been described as bronze, copper red, reddish, and sometimes even white. Mungo Park found them in the western parts of Senegambia, and Crowther on the Quorra River, mostly with tan-colored complexions, silky hair, and agreeable features. Oldendorp thus describes a Foulah: "His black hair was like that of Europeans; his color less black than that of the Negroes, the nose not so flat; the lips black, not red like

those of the Negroes." According to Vater's conjecture, the Foulahs belong to a race intermediate between the Negroes proper and the African whites.

The Foulahs are a warlike, pastoral nation ; in the course of the present century they have become politically organized, acquired dominion over a great part of Soudan, and in 1805 founded Soccotoo, the metropolis of the kingdom. The Foulahs are strict Mohammedans, and eager to make converts to their faith. They exercise a powerful influence upon the moral and social condition of the Central African, and will perhaps be the instruments to be employed in the future civilization of their vast continent.

The houses of the wealthy are constructed of cylindrical air-dried bricks, one story high, with but two rooms, flat roofs, and very brightly whitewashed. A hole in the roof serves in place of a chimney. Persons of the poorer classes live in small conically formed huts, composed of trunks of trees, and covered with straw, as represented in *pl. 26*, in the background between *figs. 8* and *10*. The mosques are also built of air-dried bricks. In both houses and huts the greatest neatness prevails, and much attention is paid to the construction and maintenance of good streets and roads.

The dress of the Foulahs consists of long full cotton trowsers, shirts, and conical straw hats. The material from which these garments are manufactured is woven and dyed a handsome blue color by the people themselves. Cloth is also made by them of the long wool of their sheep. According to Oldfield, Fellatah women adorn themselves with assiduous care, their toilet occupying several hours. They dye their toes and hands a pretty purple, and their front teeth with different colors, one blue, two others purple, and yellow, leaving the fourth white. The eyelids are marked with sulphuret of antimony, and their hair is plaited into four perpendicular bunches, four or five inches in length. Their bodies are coated with a red paint, in order to heighten the color of the skin, and to correct the odor of the perspiration. The same observer states also that the Fellatahs are very fond of dancing and other recreations ; and like all negroes with whom he became acquainted, at the times of new and full moon, pass their nights in these diversions.

In number and power the *Mandingoes* rank next to the Foulahs. They are found in the western sections of Central Africa, where they inhabit the upper regions of the Senegal, the Gambia, and the Joliba Quorra. From these districts, however, they have spread over all the neighboring countries, where they constitute the wealthiest, best educated, and most influential portion of the inhabitants, although inferior in numbers. They are genuine negroes, black, with a mixture of yellow. They are laborious, industrious agriculturists, who maintain their land in a good state of cultivation, and rear a considerable stock of neat cattle, sheep, and goats, but like the Foulahs keep no swine.

The Mandingoes have schools, and learn to read and write of their priests. They are as zealous Mohammedans as the Foulahs themselves, and better educated than other negro nations. Their disposition is mild,

feeling, and benevolent, probably the consequence of their predilection for trade, and the journeys which occupy much of their time. They pay attention also to fishing, and the manufacturing of leather and iron. They do not form one state, but are split into numerous societies, which not unfrequently wage war against each other, being at times limited monarchies, at other times republics. Bambouk, renowned on account of its gold mines, Satodon, and Honkadon, are the most important of these states.

In spite of their industry in the field, as well as in traffic, the Mandingoes love their comfort and repose, and are neither hunters nor fowlers, taking most pleasure in banquets and a kind of game of draughts.

The Mandingo language is split into numerous dialects: the *Bamboukee*, spoken by the inhabitants of the kingdom of Bambouk; the *Curanco*, belonging to a tribe more resembling in their manners the rude Timmanies than the cultivated Mandingoes, and who comb their very woolly hair in large balls over both temples, file their teeth to a point, and tattoo their breasts and backs; the dialect of the *Bambarras*, part of whom are still heathens; that of the *Jallonkas*, in the highest section of Senegambia; the dialect of the *Sokko* or *Assokko*, who reside east of the Jallonkas, along the Congo mountains, in the countries back of the Gold Coast, and who seem to be more civilized than the surrounding nations, their religion being a mixture of Christianity and Mohammedanism, owing probably much of its form to national ideas and usages; the dialect of the *Serravallies*, who are also called *Serakhalehs*, *Saracolets*, or *Tilubunkoes*, and inhabit the kingdom of Galam or Kadshaga. It is, however, not entirely certain that the latter nation is to be included among the Mandingoes, although their language is understood in a large portion of the northern Mandingo country.

The *Jalloffs* (*Jolofs*, *Jolufs*, *Walofs*, *Wolofs*) live in the lowlands of Senegambia, between the Senegal and the Gambia. Less numerous than the Foulahs and Mandingoes, they have nevertheless always been distinguished as a powerful, active, and warlike nation. They are tall and slender, have regular features, somewhat rounded noses, not very thick lips, crisp woolly hair, and the skin is of a very glossy black color. They are described as the handsomest negroes of this part of Africa, and their women as particularly good-looking. They are, however, said to be proud, malicious, revengeful, lying and deceitful, gluttonous, intemperate in drinking liquors, lazy and averse to labor. Hospitality is the only good quality for which travellers give them credit. Their magicians and soothsayers are greatly respected amongst them. A small stock of cattle constitutes their only property. In former times the Jalloffs were the subjects of a single prince, at present they are divided into many small states governed by insolent despots. Among the Jalloffs are classed the *Serreras*, a pastoral people that live in the neighborhood of Cape Verde and upon the confines of the Jalloff country, and go entirely naked.

The hot and fertile *Gold Coast* of West Africa extends from the River Sucrio to the Rio Volta. Besides the products of the vegetable and

animal kingdoms, the country possessed at one time an abundance of pure gold, and hence the name of the coast. This rich source of the precious metal has, however, been almost exhausted by Europeans. The *Negroes of the Gold Coast* are not like those on the Senegal and Gambia, but are quite as well formed. Their complexion is a deep shining black, the eyes sparkling, and the teeth white. In youth these negroes endeavor to check the growth of hair upon the face; at a more advanced age, however, many wear handsome curled beards. The hair of the head is shaved off, with the exception of a tuft upon the crown. Women ornament this tuft with gay-colored feathers and gold pins, and usually paint their bodies with white figures, whilst their faces are mostly decorated with blue and green. Among both sexes, the greater part of the body is unclothed. Metal rings encircle the legs and arms. The weapons are spears, bows and arrows, guns and knives, and shields for defence against the assault of an enemy. Besides their arms, they attach to their persons a vessel in which the provisions are kept, a calabash to be used for drinking, and, when setting out for battle, a strong bast rope for tying their captives. Warriors sometimes wear on their heads the dried scalp of a slain animal, which they smear with blood.

The habitations, which are round, consist of wicker-work covered with loam, and have roofs of palm branches. A bunch of rushes projects at the top like a crest. As every house has but a single apartment, every family usually possesses several dwellings, which are inclosed by a hedge. Men of rank, accustomed to luxury, however, in consequence of intercourse with Europeans, have larger houses with several rooms.

Owing to the fertility of the soil, the cultivation of the earth gives but little trouble. The Gold Coast Negroes are not unskilful smiths, and now even manufacture guns. Neat baskets, mats, and parasols are plaited by them with considerable dexterity. They are not particular in the selection of food, and eat many animals that civilized people would not willingly touch. In their disposition they exhibit, like all the natives that associate with Europeans, the strongest mixture of good and bad. They are mild, sympathizing, hospitable, but in a high degree slaves to their sensual desires, sacrificing everything to their gratification. At the same time they are proud, and oppress wherever they are able to domineer. As enemies they are implacable, and their thirst for revenge is great. The slave trade hardens them; the desire for fire-water, the brandy of Europeans, smothers in them all delicate feelings: but notwithstanding all this, they love and take great care of their children. Like all negroes, they give themselves up to sluggish repose; and if they own slaves, the latter are obliged to perform all the work. In case they have none, the greater part of the labor falls upon the women. All negroes are exceedingly fond of dancing. At times, also, a kind of pantomimic representation is given. Games of hazard are often played with great passion; and many a man stakes his entire property and estate, and indeed even his liberty. Almost every village has its ruler or king, who, however, has no particular marks of distinction, unless intercourse with Europeans has induced him to adopt

something of the sort. He governs, however, with harshness ; awards punishments affecting money and property, liberty and life ; but even the severest penalty may be bought off by means of presents. Justice is administered altogether according to his arbitrary will.

The religion of most of the negroes of the Gold Coast is heathenish ; they are chiefly pagans ; a few, however, lukewarm Mohammedans, or Christians. Among them, as among all negroes, respect for the priests prevails ; and priestcraft rules, afflicts, and oppresses the ignorant poor. Judgments of God are usual among them, and through their instrumentality revenge and avarice are often gratified, and the innocent crushed.

Between the Gambia and Sierra Leone are many other small tribes ; among them, 1. The *Feloups* (*Felloops*), living in villages in the thickets on the Lasamanga and the head waters of the Vintain, a river emptying on the left side of the Gambia ; 2. The *Banyones*, and to the south of them, 3. The *Papels*, a savage, cruel, revengeful, and warlike tribe ; 4. South of the Papels, the rude and ill-favored *Balantes* ; 5. The large, strong, cruel, and savage *Bissagoes*, inhabiting the islands of the same name ; 6. The *Biafars*, considered the handsomest nation of this coast, and living on the Geba, facing the island Bissao, and as far as Koli, where they are bordered by 7. The *Basares*, who are reported to be cannibals. In the same vicinity live also : 8. The *Natubes*, separated from the Biafars by the Rio Grande. Between the Rio Nunez and Sierra Leone, on the banks of four other navigable rivers, are, 9. The *Zapes*, 10. The *Foolics*, 11. The *Cocolies*, and 12. The *Nalez*, all idolaters. Almost all these tribes are described as repulsive savages, with large and coarse features, flat noses, and of dirty and livid complexion.

The *Soosoos* live in the immediate vicinity of the British settlement of Sierra Leone. Next to them reside the *Booloms*, in whose territory the colony alluded to is situated, and who extend to the Island of Sherbro. Then follow the *Timmanies* and *Bagous*, or *Bagas*. All four are handsome and strong, with prepossessing features, and less barbarous than the preceding. In the highlands back of Sierra Leone, south of Fouta Jallon, in the district of the sources of the River Mungo and of the Rochello or Sala, live the warlike, powerful *Soulimas*, who are among the most cultivated and handsome of the heathen nations. Close to them, beyond the sources of the Joliba-Quorra, are the *Sangars*, similar to the last named ; and south of them, the *Kissis* and *Limbas*. Of the numerous small tribes peopling the Grain and Pepper Coasts, and the Ivory Coast, to the east and west of Cape Palmas, as well as the interior of the back country, we name only the *Kroohs* (*Kroomen*, *Karoos*), the *Kangas*, *Mangries*, *Giens*, *Deys*, *Gorahs*, *Greybos*, *Bassas*, *Fihs*, *Queahs* (*Keahs*), *Kassouhs*, *Quoies*, *Hondos*, *Folgies*, *Gebbes*, *Timmes*, *Quilligies*, and *Puys*. On the Ivory Coast, between Cape Palmas and Cape Three Points, and the country behind this shore, the *Quaquas* are esteemed the principal nation. Here belong, moreover, the *Isinis* or *Oshin*, *Ghiomos*, *Veteres*, and *Esieps*, who likewise live along the Ivory Coast. In the back country live the powerful *Buntakuhs*, bounded on the east side by the kingdom of the *Ashantees* (*Intas*)

The latter are well proportioned, with handsome oval faces, sparkling eyes, small ears, and high, thick eyebrows; well proportioned mouths; good-looking, clean, white teeth; fresh red lips, neither very thick nor pendent; and not very broad noses. Their hair is long, curly, and tolerably soft. Their complexion is deep black. The religion of the Ashantees is a rude, bloody idolatry, or fetish worship, their form of government a tyrannical despotism, and their captives are tortured to death. Round about the Intas, of whom, properly speaking, the Ashantees are only the principal nation, are the *Akraes*, formerly powerful, but at present greatly thinned by the Ashantees. They likewise are rude heathens. The *Foys*, or *Dahomies*, are the inhabitants of the kingdom of Dahomey, or Dahomet. They are called Foys after the country Foy or Fouin, in which they formerly resided, and which lies to the north-east of their present territory. They have their own language, of which the *Widah*, *Ardras*, *Papaa*, and *Atshe*, or *Watshe*, are dialects. The Foys are industrious, and in spite of their despotic government, have made the furthest advances in civilization of all the heathen negro nations; for which they are indebted to their long intercourse with Europeans, who for centuries have resided near them, in order to carry on the slave trade. The Foys are well formed and large of stature, but have not the soft features of the *Akraes*. The women are very ugly. The Foys display a remarkable mixture of savageness and civilization, of barbarity and lofty sentiments.

In the interior of the delta overspread by the great Niger with a network of river-channels, the most numerous nation is constituted by the *Iboes* (*Iboes*, *Eboes*), on both sides of the Quorra, eastwardly, as far as the River Calabar; other tribes residing there are the *Igan*, *Evo*, *Bibi*, *Mokos* (*Mokko*), *Benines*, *Calbra*, *Camacons*, *Omuns*, *Acanucunus*, and *Inniong*.

The inhabitants of the *interior of Africa* are divided, according to their languages, into six principal nations: *Kissures* of Timbuctoo (West Soudan); *Haussans*, or *Gouberies* (East Soudan); *Bornouese*; *Eyeos*; *Mobhans*; and *Bergharmese*.

The *Kissures* are a civilized negro nation, very little impressed with the negro type. Mohammedanism has spread over the whole of Soudan, but its inhabitants are not such strict professors as the Foulahs. They are tolerant, and polite and friendly to every one. Towards females also they are not so harsh as the Senegambian and Guinea negro nations. Women are permitted to go unveiled, but not to eat with their husbands, nor even with their own sons. Besides the language of the country, the Arabic is in general use, and they have also Arabic letters. The inhabitants of West Soudan are very intelligent. Their principal employment is husbandry (the cultivation of maize, millet, tobacco, &c.); but less attention is paid to rearing cattle. The labor of farming, however, is mostly consigned to slaves, the free rich devoting themselves to traffic, the poor of the cities to handicrafts. The *Kissures* live very well; their principal food is rice; fresh meat, however, forms a part of the meals almost daily. They sit around a large platter, out of which the food is taken with the fingers, as is customary amongst all the nations of the interior. The cities, Jinnee

and Timbuctoo for instance, are like the villages of Europe, but surrounded with walls 14 feet thick and 10 or 12 feet in height. The houses are built of air-dried bricks, one story high, with flat roof, the windows opening on the court. Every house has a flight of steps leading up to the roof. The *streets* are irregular, and often very broad.

The dress of the Kissures approaches the graceful costume of the Moors. In *pl. 26, fig. 10*, a girl is represented, wearing a conical cap, a short-sleeved blue jacket, richly ornamented with gold, over the wide-sleeved chemise, and a boddice fitting tight on the bosom; the jacket being encircled above the hips by a wadded white and red striped border. The frock, which reaches below the knees, is trimmed with broad gold lace. The wide scarlet mantle is only slung around the hips in fine weather. Small slippers are worn on the bare feet, and a wide ring loosely girds the ankles. In the right hand, the girl here represented carries a feather brush or fan.

Hereditary princes are at the head of the government, which is based upon the directions of the Koran, and is described as being very mild. The King of Timbuctoo has lost much of his independence by the incessant inroads of the Tuaricks, called *Sorgous* by the Kissures. The royal house is marked by no splendor, and the sovereign lives in a style little better than that of his subjects.

The Gouberies, or *Haussans*, all speak the language of Gouber. Before the last conquests of the Foulahs in Soudan, the different tribes of East Soudan, as Prichard informs us, had become the subjects of one sovereign, and were blended into a single kingdom which was called *Haussa* (*Houssa*, *Hawsa*), after the principal state. The inhabitants spoke a dialect of the language common to the whole nation, since then called the Houssa dialect, and which seems to have been divided into more or less varying sub-dialects, according to the different provinces in which it formed the idiom of the people. The East Soudanians are not entirely black, have interesting physiognomies, with small, not broad noses, and their appearance is less repulsive than that of the negroes of Guinea. Their eyes are black, with a frank and noble expression. True beauties are found among the female sex, hence the women are greatly esteemed as slaves. Since the inhabitants are yet exposed to being sold as slaves, it may be presumed that they have not yet all embraced Mohammedanism. The Houssans are a subdued nation, under the dominion of the Fellatahs, who have settled in numerous colonies among them. The former, however, have retained their old customs and occupations. They pursue agriculture, rearing cattle, mechanical occupations, and traffic in the interior of the country. They live in villages and towns, the latter of which, Kashna (*Kasnea*) for instance, are frequently very large. The sword and bow and arrows are the weapons in use. Women often color their hair, hands, feet, thighs, and eyebrows, blue; and among both sexes, the teeth and lips are generally dyed.

The Bornouese, inhabitants of Bornou, are blacker, stouter, and have more strongly marked features than the Houssas; but handsome figures are also found, especially among the women, who not unfrequently have a

complexion more inclining to brown. The Bornouese call themselves *Kanowry*; and the rude mountaineers, who are still heathens, *Bedies*. From descriptions of this nation, we learn that they, particularly the Mohammedan portion, are peaceable, quiet, timid, and polite, but revengeful withal. A certain melancholy is said to be perceptible in their looks. The cultivation of grain is the principal means of support; rearing cattle is followed to a great extent by the immigrated Arabs, who are here called *Shouas*. Few of the industrial arts are practised in this country, and hence the Bornouese are obliged to look to commerce with foreign lands as the means of obtaining many articles considered necessary. Tattooing and painting the body blue are still in use among the Bornouese. Bornou possesses large towns, surrounded by walls forty feet in height and twenty thick, and the houses are pretty and roomy; in the country, however, they have only straw and mud huts. Bornou is under an absolute elective prince. The chief power rests, nevertheless, in the hands of the grandees, who form the court of the Sultan. Their government is based upon the Mosaic code, and is said to be just and tolerably mild. The Bornou girls (*pl.* 26, *fig.* 8) wear petticoats reaching below the knee, and over them blue garments which leave the arms and left breast free. Their hair hangs down on both sides in short braids, ornamented with pearls, and a red frontlet girds the temples, another riband being attached to it, which lies across the crown of the head. On the feet they wear sandals.

In the southern section of the kingdom of Houssa, on both sides of the Quorra Niger, there are tribes who differ from the Gouberies in language and manners. Among them are the *Eyeos* (*Ayos*, *Oyos*, *Okyous*), whose language is the national tongue of the kingdom of Jarriba or Eyeo, and of the province of Borgou or Borgho, which is divided into many small states. Clapperton says of the natives of Jarriba, that they have less characteristic negro features than any other nation of Africa; the lips are not so thick, and the nose is somewhat aquiline. He describes the King of Boussa (*pl.* 26, *fig.* 9) as a handsome man, and our representation appears to corroborate this account. His overcoat is green with red stripes, and worked with arabesques. Turban, sash, and the wide trowsers are scarlet; the boots yellow. Lander was astonished at the regularity of the features, the elegance of the form, and the great dignity in the manners of the black king of *Kiama*. In *Wawa*, the men are tall and well formed. The greater portion of these tribes are still heathens, but human sacrifices are not offered. Lizards, crocodiles, tortoises, boa constrictors, &c., are their fetishes. The Eyeos trace back their origin to Bornou, and assert that their country was formerly inhabited by the Cumbries, who, at the time of their immigration, were driven out of Bornou into the mountains and forests. On the western shore of the lower Quorra, a short distance above its junction with the Tshadda, is the district of the *Ibbedos* (*Kakunda*).

To the east of Bornou lies the country of *Mobba* (*Bargou*, *Dar Eseleh*, *Wadai*, or *Wadey*), whose inhabitants are not very dusky black, and among whom the negro type is in some cases more, in others less observed. Islamism is their religion, and instruction is given in reading and writing

Arabic. They appear to be mild and frank, and veracious towards strangers. The metropolis is called Wara.

The *Begharmese* inhabit the country Begharmeh (Begharmi, Bagermi), have their own language, and are mostly Mohammedans. They are proud and warlike, but also industrious; their cotton weaving and dyeing deserve especial mention. This nation is continually at war with the Bornouese. In the neighborhood live, also, the *Mandarans*, and the powerful, warlike *Mangowies*, as well as the repulsive *Biddomah*.

In the southern and eastern parts of *Kordofan*, and *Dar-Fu* bordering thereon, and as far as the White Nile (Arabic *Bahrel-Abiad*), and along this river, there are various *Nuba* or negro tribes, speaking different languages. According to Rüppel, four dialects are spoken in Kordofan by the same number of nations (*Koldagi*, *Chabun*, *Takele*, and *Deier*, or *Dahera*), who are all united under the name of Nuba. Besides the Nubas, we mention the *Fouries*, *Rungas*, *Begos* or *Dageous*, *Zeghawas*, *Kullas*, *Fertits*, *Denkas*, and *Shillooks*. The latter inhabit the mountainous country of Bertrat, rich in rivers, which borders on Fertit, south of Kordofan and Dar Fur, and to the west of Abyssinia. A portion of the last mentioned nation, in the beginning of the sixteenth century, took possession of Senaar, and erected the city of that name the metropolis of their kingdom, as it was then constituted. Here they call themselves *Fungi* (signifying "conquerors" in Arabic), whilst they give the names *Ahbts*, *Abhd*, or *Nuba*, that is to say, negroes, to those of their tribe and language remaining at home in Bertrat. To this nation probably belong the negro tribes who live in the low swampy and forest districts at the foot of the Abyssinian highlands, and are called *Shangallas* by the Abyssinians. The *Shangallas* prefer a savage existence by hunting, fishing, and robbery, and are without social coherence, except in cases of single hordes or families. They are rude and barbarous, subsist on the flesh of wild animals and fish, are devoted to idolatry, dwell in caverns, and pay no attention to agriculture and the rearing of cattle. With the Abyssinians they live in a state of perpetual warfare. Like the Shillooks, they seem to worship the sun and moon. The *Koldagi-Nuba* are husbandmen, and inhabit the central and northern section of Kordofan. *Pl. 26, fig. 12*, represents Negroes of Central Africa worshipping a fetish. *Pl. 28, fig. 3*, Negroes about a slain elephant.

According to Lichtenstein, the inhabitants of the entire southern half of Africa, from the equator, and even a point beyond it on the north, as far as the confines of the Cape Land, or the territory of the Hottentots, belong to a single stock, since they are united by a common language, spoken in different dialects. The philologist Marsden has corroborated this assertion.

At present the western tribes, or *Congo Negroes*, are split into numerous small states, but formerly belonged to a single nation. They lived in the north-eastern section of the country, but extended their conquests so widely as to advance to that part of the coast now called Congo, and drove the tribes then dwelling there to the south. The conquerors called them-

selves *Molua* (chief). A kind of pestilence, however, forced them, with the exception of a portion, back to their own country. The colony remaining behind were usually denominated not only *Memba Molua*, but also *Abunda* (conquerors). This territory was afterwards re-conquered by a chieftain of the dispossessed natives, called Angola, and his name was finally applied to the country itself. The *Bunda* is the most universal language of the kingdom of Angola; it is said to be derived from Cassange, is spoken also in Mattemba and Libolo, and is very near akin to the Congo tongue. The latter is in use in the entire region of country extending from the banks of the Lifune to Cape St. Catharine, on the border of the kingdom of Loango, and is prevalent in the latter kingdom also. On the southern side of the river Coanza, another, the *Benguela* language, is spoken, containing, however, many words of the Bunda.

The negroes dwelling in eastern Congo, and still independent of Portugal, are very different from those under Portuguese dominion. They are more active and courageous; are expert warriors, who often quarrel with neighboring nations, in order to take from the latter their women, children, and cattle. The coast regions are more densely populated than the interior of the country.

The complexion is not equally black in all the Congo negroes, but the skin is universally very glistening, which is the more apt to be the case from the fact that they smear themselves with animal grease or palm oil. The forehead is narrow, the nose thick and flat, the chin short and bent backwards, the hair woolly and grey in old age; the jaws are long, the lips turned out, and the ears large.

We here take occasion to mention also several other peculiarities that have been observed in the negroes generally. Thus, for instance, the brain of the negro cranium is of a brown color, and weighs from two to four ounces less than that of white people. The bones of the cranium are stronger with the negroes. In fevers, discharged bile is black in color, thick and flaky; among the whites, on the contrary, it is brown or grass green. The blood of the negroes is dark brown, in death viscous, black, and so thick that it appears to unite with the flesh into one mass. New born children are bright copper-colored, but become darker after a fortnight; the aged are yellowish black. The blood is two degrees warmer on an average than that of the whites. Negroes in Africa soon grow old, so that a negro of thirty years of age is not more vigorous than a white man in Europe of from fifty to sixty. Negroes numbering over forty years are even rare. The perspiration of the negroes smells very offensively, especially after violent exercise, dancing for instance. Females grow old still sooner than the men; as early as the twenty-first year the infirmities of age begin. When at work, women have their children upon their backs; even whilst dancing they keep the latter with them, and never trust their offspring to the care of strangers. In the coast districts, the small-pox and gout very frequently occur; but at a distance of not more than 130 to 160 miles, these diseases are entirely unknown. The Congo negroes look rude, sullen, savage, and cruel, but in spite of their serious

disposition engage in jokes and raillery, and laugh with a hearty good will. Their intellect is generally of a very inferior order, they comprehend with great difficulty, and reflection appears to fatigue them; they give themselves up to sensual enjoyments and pleasure without the least restraint, and their highest good fortune is inaction. The fetishes worshipped by them are either certain living animals, intrusted to the care of youths and maidens employed for the purpose; or representations of human beings and animals carved by themselves; sometimes also plants, chiefly trees. The negroes pray to these idols, not from fear, but with a view of persuading them to show them greater favor; and the sorcerers and jugglers employ every means to keep these poor creatures in their superstition. They believe in a sort of spiritual existence after death, and in a transmigration of souls; and the negroes acquainted with Europeans entertain the desire that after death their soul may go into the body of a white man; indeed, they even beseech their gods, if there is no place ready for it, to keep their soul in heaven until it can pass into a white man. Some tribes are said to be cannibals. Negroes bear bodily pain with the greatest calmness; and a sound indicative of suffering is seldom heard from them even when undergoing the most horrible torments.

Pl. 28, fig. 6, baptized negresses of Benguela; *fig. 8*, armed Molua negroes guarding the king's house; *fig. 9*, human sacrifice among the Cassange negroes; *fig. 4*, a negro chief under the Portuguese dominion surrounded by his chieftains and wives; *fig. 5*, solemnity in honor of the dead among the negro tribes south of the river Coango; *fig. 7*, negro soldier of the Portuguese possessions.

In the regions on the coast of the Indian Ocean, from the confines of the Cape Land to a point beneath the equator, there is a race differing greatly from the negroes proper. Their skull is high-arched, the entire head of an agreeable form, the nose not flat, and the teeth of dazzling whiteness; the lips nevertheless are large, and the cheekbones prominent. The men, in particular, display a vigorous and slender form, and their limbs are strong and symmetrical. Their complexion is brown, but towards the equator passes into the deepest black; the hair is black, short, and woolly.

When the Portuguese came to the coasts of Sofala and Mozambique, they found two kinds of inhabitants: Arabic colonists of mixed or pure blood, and the dark-colored natives of the country. The former, being of the Mohammedan faith, were denominated by the Portuguese, *Moors*; the latter, however, were called by the Arabs, *Kafirs*, that is to say "unbelievers." This name was retained by the Portuguese, corrupting it by degrees into *Kaffers*, or *Caffres*, which is now applied to a tribe whose territory is not confined to the eastern coast merely, but extends over the entire elevated country of South Africa, as far as the Atlantic coast. *Caffreland*, or *Caffraria* proper, reaches from the Keiskamma (the river constituting the boundary line between Caffraria and the British Cape Colony) to an undetermined boundary which falls a little to the south of Delagoa Bay. The western border is said to be in the district of the sources of the Orange river, emptying into the Atlantic ocean, and the

river Mapoula, whose mouth is in Delagoa Bay. The Caffres are divided into four great nations: *Ama-Kosa*, *Ama-Temba*, *Ama-Ponda*, and *Ama-Zula*.

The Caffres are cheerful, frank, and manly, and engaged principally in rearing cattle, less in hunting and farming; the herds constituting their chief means of support. Amongst them are found traces of a belief in a higher being, and in inferior spirits; but they have no regular worship. Circumcision is general amongst the Caffres. Their clothing consists of the skins of animals, which these people understand how to reduce to softness and pliancy. Their weapons are a spear, a broad shield of buffalo hide, and a short club; sometimes also a kind of sword. In their wars, which are not very bloody, the Caffres show respect to the female sex, and also treat European women that fall into their hands in a very humane manner. To European missionaries, merchants, and travellers, they always manifest friendship, provided they are not met in company with a detachment of enemies. The Europeans, notwithstanding all this, show little justice or humanity towards them, but on the contrary subject them even to the most shameful cruelties.

The Hottentots (pl. 1, fig. 16), whom we have already described, inhabit the southern end of Africa.

When the Dutch (in the 17th century) set foot upon this section of South Africa, as friends of the natives, the latter gave for toys and a few bottles of gin, as much land as was required for a small settlement. The natives, at that time, were a tolerably numerous nation, living in prosperity on the produce of their herds, and divided into many tribes, each under its own chief. They called themselves *Quaique*; the name *Hottentot* was entirely unknown to them, and its origin is not ascertained. A sheepskin cloak served as a dress by day, and as a covering during the night. Cell-like huts, constructed of piles and boughs, and covered with beech mats, protected them from the effects of the weather, and could easily be carried from one spot to another, by means of their pack oxen. Their weapons consisted of a light spear, and a bow with poisoned arrows. For half a century, perhaps, the Europeans remained true to what they had promised, and manifested no hostility towards the natives. After this period, however, they broke their friendship, endeavored to enlarge their settlement, and hence waged war against the remote tribes, gradually taking possession of a great part of the Cape Land, driving back the tribes of the *Namaquas*, *Corannas*, and *Bushmen*, into the barren deserts, and not even permitting them to pasture their herds in the less fertile regions; so that these poor creatures were at length no longer able to keep cattle, and their herds also passed into the possession of the robbers who had seized upon their pastures. Having lost their possessions in this manner, they were constrained to become bondmen to the Dutch, and thus finally saw themselves deprived of personal liberty, and treated in the most cruel manner, by the Europeans. Hence it is not surprising that a nation, so innocuous, so gentle and quiet by nature, sometimes arm themselves in order to regain their liberty. In later times, since 1828, they have been placed in the same

grade with the rest of the inhabitants of the Cape, and are no longer bought and sold; but they are always treated in the harshest manner by their masters, never receive the clothing and better food of slaves, and are employed for work for which the latter are considered too good. Thus they are sent, for instance, as keepers with the herds of their masters, into sections of the country where life is placed in jeopardy, and where they are not unfrequently torn to pieces by lions. The moral condition of the nation is, in general, improved, and they endeavor to provide a better education for their children than was formerly given. When, in the year 1829, a tract of their land was restored to a few Hottentots (about 250 men capable of bearing arms, with their families), the pursuit of agriculture was commenced by them with such zeal and attention, that many soon rose from the most pinching poverty to tolerable wealth. The neighboring tribes of the Caffres, who in the beginning manifested hostility, finally entered into friendly relations with them; and as more and more of their own countrymen obtained permission to join them, their number rose at last to 4000 souls, 700 of whom were armed with guns. Virtue, industry, and temperance now increased amongst the Hottentots, and at the present time they appear to be subjects of the most loyal and peaceable character.

The inhabitants of the *East Coast* of South Africa, from Inhambane to the equator, differ from the Caffres in external formation, but as far as language is concerned, are nevertheless to be included with them. On the coast of Mozambique are, the *Maquas* (*Makwanos*), the *Madshowyin* (perhaps synonymous with *Mongas* or *Mondshus*), the *Mtshauva*, the *Mnichempani*, the *Mlomoi*, and more in the interior the *Maravis*. Round about Delagoa Bay dwell the *Ma-Puta* (*La-Puta*), *Mafumo*, *Mattoll*, and *Temby*, nations mixed up of Caffres and Negroes. On the Zambese River, in the interior of South Africa, are the very savage *Mumbos*; and nearer the coast, the *Zimbas* or *Mazimbabwas*; both said to be nations of cannibals. Northwardly from the Maquas, upon the coast of Zanzibar, from Magadoxo to the vicinity of Mombasa, are the Mohammedan *Souhaili*, or *Sowahili*.

The tribes of the highlands of the interior, the *Beshuanas* or *Bichuanas*, are subdivided into numerous branches; and separated from them by a great desert and on the coast of the Atlantic Ocean, live the *Damaras*. North of the *Beshuanas*, in the district watered by the Zambese or Cuanna, are the *Macarouga*; north and north-west of these the *Bororas* (*Maravis*); next follow the *Mowiza*; and besides those mentioned, the *Mucamango*, *Mutshiva*, *Monomoezi*, and *Wambungo*, are particular tribes.

Upon the elevated region of the interior portion of East Africa, is the savage and numerous nation of *Gallas*; of browner complexion, and with long black hair. Akin to them appear to be the *Dankali* and *Sumali*, living to the east of the Gallas; as also the *Shohos*, who inhabit the eastern declivity of the Abyssinian highlands towards Massua, and the neighboring mountain districts. The *Dokos* are a very savage race, scarcely four feet in height; their complexion is dark olive; and in customs and habits they stand in the lowest of all grades of civilization. They are in no way allied to the Gallas.

There are but few islands around Africa : almost all of them are small, hence without especial influence on this division of the world. Even Madagascar has, until the present time, been entirely cut off from Africa by the strong oceanic current in the Mozambique channel. Nevertheless we cannot allude to the largest African island without at least a brief statement in regard to its population.

The *Island of Madagascar* is inhabited, besides Negroes (on the west coast) and Caffres (in the south), by the *Malpushes* and *Horas*, both the latter being denominated *Madagasseees*. Both have, in general, similar manners ; the Horas, however, are the more warlike. On the whole, they are distinguished for a fine growth, are of more than medium size, and of a complexion similar to that of the Abyssinians ; they have short, crisp, and black woolly hair, but regular and agreeable features. They are lively, and fond of sensual enjoyments. Their dress is very simple, consisting of a strip of cloth which is wound around the hips, and another similar one, which is thrown across the shoulders like a cloak. The women wear a broader piece of cloth arranged like a skirt, and a boddice without sleeves. Their ornaments are necklaces, armlets, and anklets, of metal, pearls, corals, &c. ; a heavy gold chain is worn around the neck and breast, which suspends various small articles. The hair, which is also adorned with trinkets, is worn in several braids, which married women wind about the head, whilst the girls let them hang down free. Long hair is esteemed an essential part of beauty ; and hence it is rubbed with oily substances, in order that its growth may be promoted.

The *Madagasseees* live in large villages, surrounded by high palisades, for protection against attacks. Their huts are very simple, of a bee-hive form, and rather neat. The doors, which are made of wicker-work, are movable, and the entrance is closed by simply placing them before the opening. Sometimes a few bundles of thorns or bushes supply the place of doors. Palm trees afford the principal material for these huts. The man of consequence builds around his large hut several smaller ones, which he divides amongst the members of his family. The entire space occupied by a Madagassee village is very attractive, being like a park of cocoa-palm, orange, lemon, plantain, and fig trees, &c., offering numerous shady places, and combining the charms of coolness, fragrance, and juicy fruits. The household furniture is very simple ; plaited mats are used for tables and couches ; the vessels are of burnt clay or wood ; palm leaves serve as table cloths, napkins, spoons, platters, and plates. The principal food is rice, which is moistened with meat broth, and seasoned with fragrant herbs and parts of other aromatic plants. Many roots, manioc for instance, are used as a species of bread. Fruits and berries add variety to the meal. The flesh of beasts, birds, and fish, is eaten boiled or broiled. Mead, with or without water, is the favorite beverage.

The Madagasseees are mostly good-natured people, benevolent towards others ; only by their intercourse with Europeans have they become suspicious, and the necessity of securing their liberty sometimes makes them cruel and treacherous. They support themselves by agriculture,

rearing cattle, fishing, several mechanic trades, and commerce in home produce and slaves. Their work evinces judgment. Iron and other metals are smelted by them, and manufactured into utensils; they make mats, baskets, pots, mortars, spears, arrows, knives, &c.; and these articles are mostly neat, durable, and perfectly adequate to their purposes. They have also boats, in which, however, they only venture on the rivers and along the coasts. The language of the country is akin to the Malay; the priests, however, understand and write Arabic also, using the peel of a species of bulrush, called *sanga-sanga*, instead of paper. A decoction of the bark of the *arandraco* tree supplies them with ink, and their pens are made of thin bamboo canes. All Madagascees were idolaters until their extraordinarily energetic and active prince *Radama* introduced among them European life (Christianity, schools, and mode of building). Unfortunately, this prince was poisoned in his twenty-seventh year, by his intriguing wife *Ranavala-Manjoka*. It must be mentioned, in conclusion, that the Madagascees have particular castes or families, from which the sovereigns, the overseers of districts, judges, freemen, &c., are chosen. Slavery is permitted, but in a mitigated form. The government differs according to the various sections of the country; in some provinces it is despotic, in others more liberal; the laws are not written, but established by custom; and appeals to the judgment of God, by means of the ordeal of poison, are not unusual.

THE INHABITANTS OF AMERICA.

Extending from the north nearly to the south pole, the continent of America comprehends almost every variety of climate. In consequence, however, of the height of the mountains and table lands, the latter of which are sometimes elevated 9000 feet above the level of the sea, and owing to the vicinity of the ocean, the number and magnitude of the rivers, and the direction of the prevailing winds, the warm regions are more exempt from excessive heat than other parts of the world under like degrees of latitude. On the other hand, the temperate countries are colder than those of Europe situated at the same distance towards the north. In North America, as in the old world, the heat decreases from the west to the east, on account of the prevailing atmospheric currents; the temperature, however, is lower upon the western coast of South America than upon the east coast, a difference caused by the violence of the winds on the plateaus of the Cordilleras, and the south polar current. America exhibits in its productions the greatest variety and peculiarity of forms, and a wealth and luxuriance, especially as far as the vegetable kingdom is concerned, observed in but few districts of the old world. Forms of plants, which in Europe are often small and unimportant, frequently occur here of colossal proportions. Boundless primeval forests, having truly gigantic trees, and interwoven with huge creepers, are spread over the great plains of America; and a luxuriant growth of grass decks large tracts of the level coun-

try. Hosts of animals enliven these regions; and the wealth in precious metals and stones is prodigious. In Russian America, the animal and vegetable worlds correspond with those in Siberia. The plants in the plains of Brazil, Guiana, and North America differ in their nature from those of the table lands of Peru and Mexico, and from those found in Patagonia and British North America; and, as a matter of course, the nearer the productions are to the tropics, the more massive and varied they appear.

The natives of America may be separated into two classes. The one embraces the Esquimaux of Greenland, Labrador, and Hudson's Bay, and the inhabitants of Behring's Strait, of Alaska, and Prince William's Sound. They are smaller than the rest of the Americans, lively and loquacious, and belong to the Mongolian race. The second class is spread from the northern sections to the southernmost point of America. They are larger, copper colored or of a lighter complexion, warlike, and taciturn. They form the American race. They have at present either adopted the white man's habits, or live as nomads and hunters. The former have fixed dwelling-places, and follow the industrial arts, agriculture, mining, and the rearing of cattle; the latter are hunters and herdsmen upon the wide prairies (llanos, pampas), and in the boundless primeval forests, or fishermen when dwelling on the seacoasts, the lakes, and rivers. A rude system of agriculture and a few handicrafts, are practised by those having regulated governments, but amongst no others. The tribes still free have republican patriarchal constitutions, the bravest and strongest individual in most cases being ruler. In consequence of the advantages derived from horses, some have become genuine robbers; others, possessing the largest herds of cattle to be found upon the face of the earth, have been transformed into confirmed nomads. Owing to the immigration of Europeans, the greater part of America has become a new Europe; for in no other division of the world have they exerted so deep a moral and political influence as here. European civilization advanced from the coast towards the interior of the country, and carried along with it the languages, religions, laws, customs, sciences, and arts, as well as the animals (particularly horses, not known before in America) and plants of Europe. Commercial enterprises and missions are driving back more and more the savage hordes of Indians. European civilization is nowhere displayed in a more successful and stronger manner than in the United States, which exhibit a popular life, a national vigor, and a cultivation, that vie with those of the first powers of Europe. But if we reverse the picture, and contemplate the enslavement of the negro race, we must acknowledge that in that at least they are inconsistent with the doctrines of freedom. Commerce and navigation extending over the whole world, have taken up their chief abode in America. America receives the productions of European industry, and gives for them the products of her soil.

We commence the characteristics of the nations of America with those of the people of Mongolian lineage.

The Esquimaux.

The Esquimaux are a tribe of northern America, inhabiting the range of the coasts on the Arctic Sea, Greenland, and the numerous adjacent islands, but numbering probably not more than 30,000 individuals, who differ entirely in formation and habits, from the rest of the aborigines of America. The *Humoky* or Esquimaux proper, considered the stock from which all others are derived, live on the eastern, western, and northern coasts of Labrador. Their principal residences are in the vicinity of the coasts, and upon the numerous small islands bordering upon it; as in such situations they are best able to follow their chief business, seal-hunting. Prominent cheek-bones, broad forehead, small eyes, flat nose, large mouth, white and naturally irregular teeth, and spotted yellow complexion, amongst the female sex somewhat lighter, characterize the Esquimaux in the main. The women only tattoo their foreheads, cheeks, and chins. They wear ringlets at the temples, and the rest of the hair is plaited as among civilized nations. Men attain a height of five feet and upwards, are broad shouldered, but do not possess so much muscular power as the Greenlanders. Adult males wear small mustachios and a diminutive beard on the chin. Like the Greenlanders, they have summer and winter residences. The former consist of tents; the latter, of caverns in the earth or hollows in the snow resembling ovens, the entrances to which are closed with blocks of ice. Raw flesh is preferred by them to cooked meat, and from this circumstance they have obtained the name Esquimaux (*i. e.* raw-flesh eaters). On the whole their customs and usages are similar to those of the Greenlanders, but to their relatives they appear much more hard-hearted than the latter, at least those uninfluenced by the doctrines of the Moravians. If the first-born child, for instance, dies, and its mother still survives, she is killed; and aged, infirm persons, widows and orphans, are robbed of their property and left to perish. The only domestic animal is the dog; it is, however, very ferocious, attacks strangers, is stubborn, and never fondles; but nevertheless displays fidelity towards its master. It cannot bark, but merely howls. Six of these dogs are usually attached in front of the sleigh of an Esquimaux, each having a collar of sealskin, to which a thong of strong leather, nine feet in length, is attached, and fastened by the other end to the fore part of the sleigh. As soon as the dogs hear the crack of the whip, they set off in a run, and are easily managed without reins, either by the voice or the sounds of the lash. With sleighs of this description occupied usually by one person only, but sometimes containing even from four to six, the Esquimaux make from forty to fifty miles in a day.

The Esquimaux inhabiting the shores of Baffin's Bay resemble those of Greenland and Labrador, but speak a different dialect, and devote greater attention to fishing and hunting. Their dress, according to Captain Ross, consists principally of fine reindeer skins. The upper garments are double, the inner skin having the hair turned inside, the outer, outside. They

reach from the chin to the middle of the thigh. A hood is attached to the back part, capable of being drawn over the head ; the flap hangs down in the manner of an apron, as far as the calves, and the sleeves cover the fingers. Two pairs of boots are worn, with the hairy sides of the skins turned inwardly. Over the boots the Esquimaux wear trowsers of reindeer skin that reach far down on the legs. Many wear shoes over their boots, and breeches of seal skin. In these clothes they appear stouter than they really are. The dresses are, however, neatly made, and sometimes adorned with fringes of sinew, or with strings of small bones.

The Esquimaux are cheerful and lively, and in spite of the small size of their bodies, capable of enduring the greatest fatigues. They possess some skill in the arts, but also all the faults of a people of nature. Upon the west coast of Greenland, and in Labrador, the greater portion have become Christians. Among those that are still heathens, the infinitely good Being is called *Ukkowma*, the bad Being, *Wittike*. Others call the former *Torogaresook*, and imagine the latter as a female without a name. (*Pl. 1, fig. 13*, an Esquimaux.)

Among the eastern Esquimaux, at least three dialects, or languages, allied to each other, may be distinguished : the dialect of the inhabitants of the north and west shores of Hudson's Bay, and which extends to beyond Mackenzie's River ; the dialect of Greenland, which may embrace two different sub-dialects, as the inhabitants of the west coast maintain no intercourse with those of the east coast, and hence speak, perhaps, a different dialect ; the dialect of the coast of Labrador, probably allied to the language of the Esquimaux on Hudson's Bay. The Esquimaux constituting the western division extend along the shore of the Pacific Ocean, from Behring's Strait southward as far as the end of the Peninsula of Alaska, in latitude 57° north, where they may be traced towards the west, over the Aleutian series of islands, and eastwardly as far as the vicinity of Behring's Bay and Mount St. Elias, in latitude 60° north, and longitude 140° west (of Paris), where they entirely disappear. According to Captain Franklin, the division line between the eastern and western Esquimaux is found on the Arctic Sea at the northern extremity of the Rocky Mountains, in longitude about 142° west ; a place where the western Esquimaux annually meet those of the east, in order to barter iron or other wares of Russian manufacture, for seal skins, train oil, and furs. This intercourse, which has not been established until recently, has shown, however, that the western Esquimaux speak a dialect so different from that of the eastern tribes, that in the beginning they had great difficulty in talking to each other. The dialects of the various western tribes differ also from one another, more than is the case with those of the eastern. To the western tribes belong the *Aleutians* ; the *Kadiacks* (*Koniages*) ; the *Chongaches*, on the shores of Prince William's Land, westwardly as far as the entrance of Cook's Inlet ; the *Agolegmetes*, at the mouths of the Rivers Nushagac and Nackneck, by whom the former inhabitants, the *Ugashenzes* and *Sewernouzes*, were driven away to the eastern part of the peninsula of Alaska ; the *Kiates* and *Kuskokwimers*, the *Quichpacs*, Ma-

gimetes, &c. Of the eastern Esquimaux, the Greenlanders claim special notice.

The Greenlanders.

The southernmost section of Greenland lies at the northern extremity of the temperate zone; the remainder, however, is situated within the polar circle: in the former, therefore, vegetables, potatoes, and oats may be cultivated, while they cannot be raised in the latter. The east coast of Greenland, for a great distance down, is beset by perpetual ice; an extent of 300 miles of the southern part of the west coast (New Greenland), however, is free from ice for eight months in the year, and hence at this season is much frequented by Danish fishermen, on which account it is the region best known. The mountains of the interior ascend to a height of more than 4000 feet, and are covered with perpetual snow and ice. The Greenlanders belong to the most innocuous of savages; and theft, drunkenness, brawls, or homicide, are things of very rare occurrence among them; but again they have certainly little susceptibility for civilization, great as is the solicitude of the Danish government in regard to the matter. Only a hundred years ago, they lived in the deepest superstition and total ignorance. Their religious traditions were a jumble of ridiculous fables, by which their sorcerers, or *Angekoks*, profited in their jugglings. Members of families display great attachment towards each other. The Greenlanders inhabit only the coast and coast islands; living, in winter, in miserable huts made of stones, earth, and turf; in summer, in tents of doubled seal and reindeer skins, in which everything is arranged with a much greater regard to neatness than is shown in the winter dwellings. Wealthy persons dress in blue cloth; but as a general rule, both sexes are clad in skins of seals, reindeer, and sea birds, the last furnishing the fur shirts; the two first, the coat, trowsers, stockings, and shoes. The dress of the women differs from that of the men only in the coat, which is wider and has a hood at the back, in which they carry their children about with them perfectly naked. Older children they sometimes place in the boots, which are wide and stiffened with whalebone. They fasten their long hair in a roll on the crown; the men wear theirs short.

The principal talent of a Greenlander consists in catching seals; in which it is of the utmost importance that he should understand the art of navigating his boat (*Kajak*). These boats are constructed of laths and whalebone, and coated with seal skins, leaving an opening in the middle of the deck just large enough to admit the body of the fisherman; so that when he takes his seat, the edge of the hole fits tight around his body over the hips, and permits no water to penetrate. At his side he places his various javelins or harpoons, securing them between the thongs fastened across the *kajak*; in front of him is his roll of line, and behind him an air-buoy, made of a small seal skin, which is attached to the harpoon. His *pantik*, or oar, has blades about four inches wide at both ends, which are

alternately dipped, the middle of the oar being grasped with both hands. With a boat of this description, he travels very rapidly, perhaps 45 or 50 miles in a day; and with the oar, not only keeps his bark in the proper position, but understands also how to right himself, in case the waves overturn the vessel. The boat used by women (*umiak*) is larger, and frequently contains ten or twelve persons, with all their utensils.

Hardly any attention is paid by the Greenlanders to rearing cattle. Reindeer occur generally only in a wild state, and have at present become very scarce. Dogs are the only domestic animals, and they are used for drawing sleighs. The flesh of seals, marine birds, and sea fish, best relished if half rotten and frozen, constitutes the principal food. Reindeer meat seldom falls to their lot. They are fond of whiskey and tobacco, especially snuff.

Pl. 35, fig. 1, represents the manner in which the Greenlanders kill seals, approaching them by creeping slowly forward and imitating their motions, and in this way decoying them.

We now pass on to the inhabitants of America belonging to the American Race. They are usually called Indians, and are divided into numerous tribes, whose various tongues may, nevertheless, be traced back to certain principal languages.

The Indians of North America.

All the numerous native tribes of North America, not belonging to the Mongolian Race, are designated by the common name *Indians*; and, in general, there is really such an agreement in bodily form, disposition, customs, and usages, that even if some differences exist with respect to details, the fact that all North American Indians have the same origin, can scarcely be doubted. Their complexion is yellow or cinnamon-brown, passing more or less into lightness or duskiness; the face is broad, but not flat, with prominent cheek bones and sharply defined features; in many tribes, however, the latter are almost as regular as those of the white man. The wings of the nose are always broad, but the eyes vary considerably; the hair is straight, stiff, and black as pitch. The Indians that inhabit the extreme north are of small, insignificant growth; those of the temperate zone, of handsome and vigorous frame; those living between the tropics, however, mostly thick-set. The men of many tribes pull out the hair growing upon their faces; others, especially those of the far west, wear beards.

Although more vigorous than the inhabitants of South America, they are nevertheless deficient in perseverance, being too much accustomed to roving about and hunting, to have the power of applying for any length of time to manual labor. They can run with great swiftness, are good walkers, and have sharp sight and hearing, as well as a very fine sense of smell. Their memory, also, is very good. A lively imagination and good judgment enable them to learn easily whatever they consider useful.

They are sound in their morals, good-natured, upright, modest, and polite to every one deserving such treatment; courteous towards each other, without flattery; and generally, also, circumspect and sedate, composed and grave. An injury to their honor is followed by certain vengeance; on the other hand, fidelity and good faith are innate with them, and their promises are constantly and invariably kept, if performance is possible.

In spite of the above mentioned good qualities, not proper, however, to all the tribes, these unfortunates find themselves driven more and more towards the west, and despoiled of their property by white settlers. Hence it is not surprising that they should appear stern and gloomy in the presence of strangers. Among themselves, they are frequently cheerful, and even frolicsome. They are witty also, and by their satirical and ingenious remarks not unfrequently excite laughter, without giving offence, however, by their observations. Their patience, long sufferance, and tranquillity are great, and they will bear the most frightful tortures with courage. They possess remarkable control over their passions; those, however, who have become acquainted with the white man's manners, easily give themselves up to drinking, as spirituous liquors are used, partly that the bodily vigor may be roused by this means, and partly that a temporary oblivion of their wrongs, and of their decayed condition, may thus be brought about.

The Indians display great love and care for their children. Wives (*squaws*), however, are the slaves of their husbands, obliged to perform the hardest and most difficult work, and but seldom receiving thanks for what they have done. The husband is occupied the entire year in hunting; whilst the labor of the field, which is left to the women, at most continues but six weeks in a season. The principal duties of the squaws, besides tilling the fields and taking care of the crops, are, to crush the corn, in order to make of it a kind of porridge, or to bake a species of bread of the meal in hot ashes. When they travel with their husbands, and the party possess no horses, they serve as beasts of burden, being obliged to carry the necessary baggage upon their backs. In the beginning of March, the whole family set out for the places where maple sugar is boiled. The women also cook the meat or dry it in the air, lay up the tallow, prepare the skins, and make cords, &c., from the wild hemp gathered by themselves. On the other hand, the men follow the troublesome occupation of hunting, which is often attended with the greatest dangers and fatigues. Any portion of their prey not needed by themselves is bartered or sold.

Some of the dwellings of the Indians resemble the worst houses of civilized countries; others are similar to tents; others again being round, and according to the climate, either open, or furnished with a roof, or closed in with loam, poles, or bark of trees. The houses have roofs projecting some distance over the entrance, so that the occupants may sit in the shade. In the establishment of a village no regard is had to regularity. A village containing twenty houses is considered a large Indian town. According to the necessities of the families, interiors of houses are divided into a greater or less number of rooms or chambers. Tribes leading a wandering

life have simple, easily arranged huts or tents. Sometimes the Indians have also large houses designed for public councils or meetings of the people. One of this sort, for example, is possessed by the inhabitants of Drummond's Island in Lake Huron. *Pl. 42, fig. 3*, represents its interior, and a meeting of the people held under a *mariapa*. The Indians have few and very simple household utensils, made mostly by themselves, and with tools of an inferior kind. Almost all the tribes have obtained iron kettles for cooking and knives, by traffic. The women, among some tribes, make their mugs and other vessels of red clay. The weapons of the Indians consist of bows and arrows, a battle-axe, called by them *tomahawk*, a lance, a spear, a club, and a scalping-knife. Many carry also shields made of buffalo hide. Firearms have of late become very common amongst the tribes of North America, the different fur companies being in the habit of exchanging guns of an inferior character for peltry, &c.

The clothing of the inhabitants of the northern portion of the country formerly consisted of skins of animals and feather dresses; while those living in warmer latitudes covered themselves with cotton stuffs or feathers. Striking colors were their favorites even at that time. At present, skin dresses are found only in the extreme northwestern and northeastern parts. Woollen blankets and shirts are now in use. Men wear leggings, women short petticoats of blue or black broadcloth. The more wealthy take pride in adorning themselves with bright-colored ribands, girdles, silver clasps, &c. Upon the painting of the face, breast, and limbs, much time is spent, particularly when they are preparing for a dance. Indians allow their hair to grow long and twist it in plaits, or fasten it together with ribands, &c.

According to the analogy of language the Indians of North America may be divided in the following manner :

A. THE KOLOSHES. In this stock may be classed all the Indian tribes that inhabit the northwest coast of America, and that portion of the interior contiguous to it, between 50° and 65° north latitude. They comprise, according to the statement of the Russian Admiral Wrangel :

1. *The true Koloshes or Koliushes*, having their dwelling-place, according to Wenjaminow, from Mount St. Elias to the Columbia River (including the Prince of Wales, and George III. Archipelagoes), but extending probably towards the south only as far as the Strait of Fuca.

2. *The Ougalenzes (Ugaljachmutzi)*, west of Mount St. Elias; in winter, on a small bay east of the island of Kadiak; in summer, on Copper River for fishing purposes.

3. *The Atnas (Atnachts, in Russian, Mjednowzi)*, on the Copper River or Atna.

4. *The Koltshans (Galzans)* on the shores of the northern and eastern waters emptying into Copper River.

5. *The Kenais (Kenaiut)*, on the coast and in the country surrounding Cook's Inlet, or on the Kenai Sound and around Lakes Illiamma and Knisshik.

6. *The Inkilichliats*, on the River Choulitra and the upper tributaries of the rivers Kuskoquim and Quickpack.

According to North American researches the Indians of the Northwest

coast, between the forty-eighth and fifty-ninth degrees of latitude, are divided into twenty different tribes, and these into four different groups of languages, embracing probably only the Koloshes proper.

1. The language of *Sitcha*.

Here belong the *Chilcart*, the *Sitka*, the *Hoodsunhoo*, the *Ark* and *Kake*, the *Eelikinoo*, the *Hennega*, the *Stickeen*, and *Tumgarse* tribes.

2. The *Naass* language.

The *Naass*, the *Chebaska*, and the *Millbank Indians*.

3. The language of the tribes upon Queen Charlotte's Island and of some others.

The *Cumshewar*, the *Massit*, the *Skiddegat* or *Skittagete*, the *Kesarn*, and the *Kigarnee* tribes.

4. The *Newettee* or *Newittle* language, which is spoken on the northwest end of Vancouver's Island in Lat. 56°.

The *Koloshes* have a strong, bony structure, prominent cheekbones, a broad, flat nose, large mouth, thick lips, and small black eyes. Men pluck out the beard. Their complexion passes but little into reddish-brown, but the practice of rubbing themselves daily with black earth gives it a darker appearance than it would otherwise have. They paint the face crosswise, with broad, black, red, and white stripes. Men and women bore the bridge of the nose, and the ears, in order to put in all sorts of ornaments, and also pierce the under lip for the reception of a bone, and a large oval double button called *kaluga*. With the exception of a small leather apron, the *Koloshes* go entirely naked, and the wealthy alone hang around them a bearskin cloak or covering of goat's hair; the richest, however, sometimes take pride also in wearing European clothing. Kotzebue calls them rapacious, faithless, and bloodthirsty.

B. THE ATHAPASCAS. According to Berghaus, if we draw a line from the mouth of Churchill or Missinipi River at Hudson's Bay, upwards towards its source where it is called Beaver River, and thence continue it along the chain of mountains which divide the north branch of the Saskatchewan River from the tributaries of the Athapasca or Elk River, and finally, carry it on westwards to within about ninety miles of the coast of the Pacific Ocean at 52° or 53° north latitude: all the Indian tribes that dwell upon the north side of this line, and are surrounded in all other directions from Hudson's Bay to the Great Ocean by the narrow belt of Esquimaux and *Koloshes*, belong, as far as known to us at present, with the only exception of the *Quarrellers* or *Loucheux*, to one family, and speak kindred languages. Gallatin has comprehended them under the arbitrary denomination of *Athapascas*. They embrace:

1. The *Northern Indians*, the eastern branch of the family, extending to Hudson's Bay, and separated into the following tribes: the *Northern Indians* proper, the *Cheppeyans*, the *Coppermine Indians*, the *Dog-rib*, the *Strong-bow*, the *Mountain*, the *Ambawta-woot* or *Sheep*, the *Kancho* or *Hare Indians*, the *Indians of the Rocky Mountains*, the *Sussees* or *Sursees*, the *Nauscuddennies*, and the *Nagailers*. Most of them speak the Cheppeyan language.

2. *The Carriers (Tacullies*, on the west side of the Rocky Mountains), 300 miles from east to west, between 51° and 58° north latitude. Dialects of their language are spoken by the *Sicaunies* and *Nateotetains*.

The *Athapascas*, and in particular the *Chippeways*, who are best known, are of medium stature, have good teeth and fine eyes, but a broad face, with prominent cheekbones and wide nostrils. They tattoo themselves, and some wear the hair long, others cut it off. They are grave, reserved, just towards each other, but deceitful and knavish towards strangers. Their dress generally consists of reindeer and other skins.

C. THE ALGONKINS, OR LENAPES, at the time of the first settlements of the Europeans in North America, dwelt in the territory north of the Missinipi River from its source to the mouth in Hudson's Bay, along the south and east coasts of that bay, east as far as to the boundary line of the territory of the Labrador Esquimaux, and south down to Cape Hatteras. The western boundary was the Mississippi up to its source, and the Red River to Lake Winnebago. The southern boundary ran from Cape Hatteras west to near the mouth of the Ohio. The numerous nations and tribes into which the family of Algonkins was divided, may be brought in the following manner into four divisions:

1. NORTHERN ALGONKINS. The *Knistenaux*, *Algonkins proper*, *Chippeways* or *Ojibways*, the *Ottawas* and *Potowotomies*, and the *Mississagues*.

2. NORTHEASTERN ALGONKINS. The *Skoffies* and *Sheshatapoosh* or *Mountaineers*, the *Micmacs*, the *Etchemins*, and the *Abenakis*.

3. EASTERN OR ATLANTIC ALGONKINS. The New England Indians, embracing the *Pequods* or *Piquods*, *Naticks*, *Narragansets*, *Mohicans* (*Mohegans*), *Pokanokets*, *Pawtuckets*, and *Nipmucks*; the Indians upon Long Island, *Montauks*, *Unchagogs*, and *Shinicooks*; the *Delawares* (*Lenno-Lenape*), the *Nanticokes*, *Susquehannocks*, *Powhatans*, and *Pamp-ticoes*.

4. WESTERN ALGONKINS. The *Menomonies*, *Miamies*, and *Illinois*; the *Sacs*, who, having relinquished their district lying east of the Mississippi to the United States, have lived since that time upon the west side of the river in the State of Missouri, partially however still in Illinois, and pursue a system of agriculture (*pl. 29, fig. 6*, Sac Indians); the *Foxes*, *Kickapoos*, and *Shawnees*.

Many of these tribes are entirely extinct, others have been divided amongst tribes that survived, but few number many individuals.

With respect to their manners our introductory statement concerning the Indians in general will hold good.

D. THE IROQUOIS, who became notorious in the history of European settlements on account of their desire for conquest and destruction, as well as for their thirst for blood, formed a northern and southern division. The northern portion were surrounded by the Lenapes. The southern division extended in the States of Virginia and North Carolina of the present day, from above the falls of the large streams, as far as James River, and south at least to the River Neuse. On the east they had for neighbors the Lenape tribes dwelling on the Chesapeake and the Ocean, on the south side

the Cherokees and Catawbias, and upon the north and west sides Lenape and other tribes now extinct.

1. *The Northern Iroquois* consisted of the *Wyandots*, the *Attiouandarons*, the *Erigas*, and the *Andastes*, the confederacy of the *Five Iroquois Nations* (*Maquas*, *Mingoes*), composed of the *Mohawks*, *Oneidas*, *Onondagas*, *Cayugas*, and *Senecas*. This confederacy soon obtained an ascendancy over the others, for which they were indebted to their fortunate geographical position, especially, however, to their wise policy, by virtue of which they confined themselves even at the times of their greatest consequence to their original dwelling-place. Against every imminent or sudden attack they were completely fortified, in the south by the broad mountain chain of the Alleghanies, in the north by Lake Ontario. Of still greater importance, however, especially in a war of savages, was their bravery, combined, however, with cruelty, in which they surpassed all other nations. In agriculture, the manufacture of their weapons, and the few arts of Indians, they were further advanced than the tribes of the Algonkin or Lenape family. Upon all occasions they displayed a high degree of intelligence, and in nothing perhaps more than in the establishment and maintenance of their league, and the attacks which by degrees they directed against the small tribes surrounding them, and who formed no confederacy.

2. *The Southern Iroquois* appear to have been known at first under the collective name of *Monacans*. Amongst them the most powerful nation were the *Tuscaroras*, dwelling in the commencement of the eighteenth century in fifteen towns on the rivers Neuse and Taw or Tar, in what is now the State of North Carolina. The remnant of the *Tuscaroras* were received, however, into the confederacy of the Five Nations some time after the settlement of Europeans in America. The *Chowans*, *Tuteloës*, and *Nottoways*, were known as particular tribes.

E. THE FLORIDA NATIONS were spread to the south of the Algonkins and Iroquois, and to the east of the Lower Mississippi; and at the present time are met with in considerable numbers. They are divided into the six following nations: the *Catawbias*, *Cherokees* (*Tsalakees*, who have become a Christian civilized people), the *Muskhogeës*, inhabiting the entire southern section of the United States as far as the extremity of the peninsula of Florida, consisting of the tribes of the *Muskhogeës proper*, the *Hitchittees*, *Seminoles*, the *Alabamas*, *Chickasaws*, and *Tuskigies*; the *Choctaws*, *Uchees*, and the *Natches*, form the Creek confederacy, and hence are called *Creek Indians*.

Like the Cherokees, the nations of the Creek alliance and the Choctaws are now engaged in the pursuit of agriculture; and it appears that their laws, courts, juries, schools, and even politics, are gradually becoming formed after American models. The Cherokees, as well as all the other Florida nations, with the exception of the Catawbias, have been removed by the government of the United States to the west side of the Mississippi, or at least this change of settlement has been commenced. Government bears the expense of the removal, and allows the Indians a handsome annuity.

F. THE CADDOES, and the other nations upon the west side of the Lower Mississippi, within the United States, are partly such as may be considered the aborigines of this section of country, in part Indians who have immigrated at a later period from the east side of the Mississippi.

To the aboriginal population belong :

1. *The Caddoes*, who at present are settled on a tributary of the Red River, about 140 miles above Natchitoches. A dialect of the Caddo language is spoken by the *Nandakoes*, *Inies*, or *Tachies*, from whom the State of Texas derives its name, and the *Nabedaches* ; 2. the *Natchitoches*, 50 miles from the place of that name on Red River, and the *Yatassees*, speaking a particular language ; 3. the *Adaize* ; 4. the *Appelousas* or *Opelousas* ; 5. the *Attacapas* ; 6. the *Chactos* ; and 7. the *Chitimachas*.

The immigrating tribes include the *Apalaches*, the *Alabamas*, and *Conchattas* (*Conshutas*), who came from the Creeks, the *Taensas*, the *Houmas* or *Oumas*, the *Tunicas*, *Boluxas*, *Pascagoulas*, and *Pacanas*.

G. THE SIOUX speak a language akin to that of the Iroquois. They rove in the country watered by the Mississippi, on the west side of this stream and the Red River, from Lake Winnipago far into the interior, even to the savannahs and prairies at the eastern foot of the Rocky Mountains. We divide them into four groups.

1. *The Winnebagoes* (*Puans*, *Otchagras*, *Horoje*, or *Hochungohrah*), between the Mississippi and Lake Michigan.

2. *The Sioux proper* (*Naudowessies*, *Dahcotas*) are divided into seven tribes, and hence call themselves *Ochente Shakoans*, i. e. the seven fires. These tribes are : (a) *Mendewahkantoans*, the only one in which tillage receives any attention, east of the Mississippi, between 43° and 46° north latitude ; (b) the *Wahkpatoans* ; (c) the *Wahkpakotoans* ; and (d) the *Sisitoans*. The three western tribes are the *Yanktons*, *Yanktoanans*, and *Tetons*. Since time immemorial, these tribes have carried on a war of extermination against all the other tribes on the Missouri, from the Mandans to the Osages ; whilst the four eastern tribes, for as long a period, have been the inveterate enemies of the Chippeways. The *Assiniboins*, a *Dahcota* tribe, separated from the remainder of the nation, and dwelt with the Algonkins ; and the *Shyennes* were driven from their residence on the left bank of the Red River, and settled at the sources of the Shyenne, a south-western tributary of the Missouri. (*Pl. 29, fig. 1*, Sioux Indians in camp ; *fig. 7*, horse races of the Sioux.)

The Sioux, like all other Indians, believe in the immortality of the soul. As soon as the warrior is assured of his death by the attending physician, he takes leave of his relations, and orders an entertainment to be prepared for those who are to deliver his funeral oration. Immediately after his decease, he is dressed and placed in a sitting posture, with his weapons by his side, in the midst of friends assembled around him. When the necessary ceremonies have been performed, the body is deposited on a kind of scaffold, as represented at *fig. 2*. The obsequies begin with lamentation and howling, in which men are not permitted to shed tears, but the women make up for all deficiencies on that score. Whilst this is going on,

they sometimes lacerate their arms and legs ; and the women frequently visit the graves and strew them with locks of hair cut from their heads for the purpose, often chanting, during the process, lamentations very poetical in style. Carver has communicated a funeral oration of a Naudowessie (Sioux) ; it runs thus : "Thou still sittest amongst us, brother ; thy body retains its usual appearance, and without any perceptible exception is still similar to our own ; but the power of action is wanting to it. But whither has the breath fled, which a few hours since blew smoke aloft towards the Great Spirit ? Why are now silent the lips from which, a short time ago, we heard such expressive and agreeable language ? Why are motionless the feet which, a few days since, were swifter than the deer upon the mountains ? Wherefore hang these arms powerless, that climbed the highest trees, and bent the strongest bow ? Alas ! every part of the structure that we regarded with admiration and astonishment, is as inanimate as it was three hundred winters ago. Nevertheless we will not mourn as if thou wert for ever lost to us, or as if thy name should never again be heard. Thy soul still lives in the great land of spirits, with the souls of thy countrymen who have gone thither before thee. We, it is true, remain behind in order to maintain thy renown, but we too shall one day follow thee. Animated by the regard which we cherished for thee in thy lifetime, we come now to render thee the last office of kindness. In order that thy remains may not be left upon the plain, a prey to the beasts of the field or the birds of the air, we will carefully place them with the bodies of thy predecessors, in the hope that thy soul may banquet with their spirits, and be ready to receive ours when we also arrive in the great spirit land." The burial-place, we will add, is usually a large cave.

3. *The Minetares*, who are divided into three tribes : *settled Minetares*, including the *Annahawas*, *Mandans*, and *Crow Indians* or *Upsaroka* nation. The two first are farmers, and dwell in villages on or in the vicinity of the Missouri, between 47° and 48° north latitude. The *Crow Indians* (pl. 1, figs. 19 and 20) are a wandering people south of the Missouri, between the Little Missouri and the south-eastern branches of the Yellowstone River. Among the *Mandan Indians*, complexions almost entirely white, and even blue eyes, occur. (Pl. 29, fig. 3, dance of Mandan women, and fig. 4, of Mandan men ; fig. 5, buffalo dance of the latter.) The buffaloes (properly, bisons) wander over the plains in large herds. The Mandans are frequently deprived of the means of subsistence when these animals fail to make their appearance. As soon as this calamity occurs, the Mandans put on their disguises of buffalo skins, and then commence the buffalo dance, performed in order to induce these animals to return, and repeated until they actually make their appearance, called, according to their opinion, by the dance alone. Whilst the ceremony is going on, drums are beaten, rattles set in motion, and the air resounds with the incessant singing and yelping of spectators.

The Southern Sioux consist of eight tribes, and their territory originally extended along the Mississippi, from a point below the mouth of the Arkansas to 41° north latitude. They lived, and still dwell, to the north

of the Dahcotas, upon the west side of the Pawnees; on the south are bounded by the Washita and Red River, and on the south-west by nomadic tribes. Their hunting grounds extend westward as far as the Rocky Mountains, but all are engaged in agriculture. The three southern tribes are, the *Quappas* and *Arkansas*; the *Osages* (*pl. 1, fig. 18*), living on the sources of the Osage and Verdigris, a northern tributary of the Arkansas, and who are a numerous, powerful tribe, that waged war against all their neighbors, but who have relinquished a portion of their territory for the colonization of the Cherokees, Creeks, and Choctaws; and the *Kansas*. The remaining five tribes are, the *Ioways*, *Missouris* or *Neojehé*, the *Ottoes* or *Wahtootahtah*, the *Omahaws* or *Mahas*, and the *Puncas*.

H. THE PAWNEES, consisting of the *Pawnees proper* (on the Platte River, to the west of the Ottoes and the Omahaws), and the *Ricaras* or *Aricaras* (on the Missouri, about 650 miles below the Mandans, in latitude 46° 30'). Agriculture is one of their occupations; and they extend their hunting expeditions southwardly as far as the Arkansas, and westwardly to the head waters of the Platte River.

I. THE SASKACHAWINS are two nomadic nations of the eastern declivity of the Rocky Mountains, viz. the *Fall*, *Rapid*, or *Paunch Indians*, and the *Blackfeet*. The former dwell the furthest towards the east; the latter are one of the most powerful Indian nations, and live in a state of constant offensive warfare with all the neighboring tribes, with the exception of the Knistineaux and Assiniboin, against whom they act defensively. The *Piekans* or *Picanos* and the *Blood Indians* are subdivisions of the Blackfeet. Perhaps here also belong the *Sussees*, dwelling near a part of the Rocky Mountains.

K. THE OREGON NATIONS, called after the River Oregon (Columbia), which commands a district upon the west side of the Rocky Mountains, extending from 41° to 50° north latitude. Lewis divided these nations, according to their languages, into three families.

1. The Mountaineers; including the *Selipsh* or *Flatheads*, the *Oatlashut*, the *Crow Mountain Indians*, and the *Tushipaw*.

2. The Uplanders; comprising the *Chopunish*, the *Sinmithkumanaw*, the *Selluatpallaw*, the *Walla-Wallas*, the *Williewaw*, the *Wahowipums*, the *Echillools*, the *Chimnapun*, the *Sokulks*, the *Chillukcutteguaw*, the *Chickailish*, the *Ponderays*, the *Flatbow Indians*, and many others.

3. The Indians of the Pacific coast: including the *Clackamous*, the *Umkwas*, the *Clatsops*, the *Quathlapotte*, the *Shilloots*, the *Chinooks* (*pl. 42, fig. 2*, interior view of a lodge of the last mentioned), the *Chilts*, and many others.

The Bonnaks are mentioned as a savage, warlike nation; the principal tribe being the *Skyuse*, in Oregon Territory, who once exercised unlimited power over the neighboring tribes, but at present are barely able to extend it over the Walla-Wallas and Chinooks. *The Atnahs* may also be ranked here (in the interior, in latitude 52°), and north of them, the *Nagailers* or *Carrier Indians*.

The Wakash, on the Island of Nootka, speak a language distinct from the idioms of all the neighboring nations.

L. THE CALIFORNIA INDIANS dwell along the coast of the whole of New or Alta California, as also on the peninsula of Old California as far as the southern extremity, Cape St. Lucas, in 23° north latitude. Whether the Old Californians are actually tribes akin to those of New California, is a fact not yet ascertained with certainty. All the Old Californians have for a long time been under the influence of Spanish missionaries, which is also the case with regard to the coast tribes of New California. But those Indians, united in missions, have been only apparently won over to the occupations of stationary and civilized life; whilst the inhabitants of the interior of California are devoted, as formerly, to a savage hunting existence. According to Chamisso, they stand much below the tribes of the north-west coast and interior of America, in point of civilization. All are of an extremely savage appearance, and very dark color. Their flat, broad faces, from which gleam large fierce eyes, are overshadowed by long, thick, even, and black hair. Modification of colors, tattooing, painting for the war dance, weapons, and customs, differ according to the various tribes. (*Pl. 1, fig. 21, a California Indian.*)

M. THE SHOSHONEES, OR CAMANCHES, fill up the entire space bounded on the one side by a line extending from the Columbia, in latitude 45° , to the Rivers Colorado and Gila, in latitude 34° . From this boundary, their territory extends eastwardly across the Rocky Mountains, and to the Gulf of Mexico, in 30° north latitude. All the tribes speak the same language and of them the Shoshonees and Camanches proper are the most numerous. The former dwell upon the west side of the Rocky Mountains, in the north-western section of the district described above; the latter are found upon the east side of the range, in the south-eastern portion of the territory; the southern regions are inhabited by the *Apaches*. The *Shoshonees* live on fish or game; those on the Colorado keep also a large number of swine as domestic animals, and many horses. Their dwellings are portable, and consist of skin tents. They are peaceable, not cruel, and very hospitable; highly intelligent also, and good in their morals. The *Camanches* (*Hietans*, *Jetans*, *Paducas*) are at present perhaps the most powerful nation of the Indians of the continent of North America; and their matchless equestrian skill, their formidable mode of attack, their unsurpassed rapidity in loading and discharging their guns, as well as their inextinguishable hatred of the whites, make the enmity of these Indians more to be dreaded than that of any other tribe of natives. They also have portable tents for dwellings, and never remain long in one place.

The *Arrapahoes*, who are allied in language to both tribes, live south of the Shoshonees.

N. INDEPENDENT NATIONS have concentrated themselves in the prolongation of the *Sierra Madre of Mexico*, in order to carry on a war of extermination against the Europeans. They have re-conquered this region from the Spaniards, and maintain a complete independence. To them belong the *Piros*, *Xumanos*, *Lanos*, *Zuros*, *Moquis*, *Tiguos*, *Pecuri*, *Keres*, *Yahi*-

pais, *Mecos*, *Carancahuas*, *Cuchaties* (the latter in Texas). They all differ from the Shoshonees and Camanches.

O. THE NATIONS OF THE PLATEAU OF MEXICO, with the districts adjoining it on the north, and on the south, as far as the Isthmus of Panama. A. von Humboldt, whom we here follow, assumes that at present the Indians of pure blood still constitute more than two fifths of the population, and in some provinces, as for example in the states of Puebla and Oaxaca, even two thirds.

The principal languages are the Aztec, the most widely spread of all, the Otomie, Matlazing, Tarask, Pirinda, Zapoteca, Mixteca, Popoluca, Mixe, Maya, Poconchi, Huasteca, Totonac, Cora, Huitcole, Tepehuana, Topias, Acaxee, Xixema, Sicuraba, Hina, Huimi, Tubar, Tarahumara, Zuaque, Guiana, Guazave, Zoe, Huite, Opata, Pima, Eudebe, Yaqui, Caquikil, Chontal, and the Orotina.

In general, the Mexican Indian resembles those inhabiting Canada and Florida, Peru and Brazil. He has the same dark brown and copper color, even and smooth hair, deficient beard; his stature is thick-set, the eye long and turned up towards the temple; the cheek bones are prominent, and the lips thick; but in his mouth are expressed a mildness and a gentleness that contrast strangely with the gloomy, stern expression of the eye. The Mexican Indians are, however, of darker complexion than the inhabitants of the hottest countries of South America; they have a stronger growth of beard, also, especially the *Aztecs* and *Otomites*. Almost all the Indians in the environs of the metropolis wear small mustachios. The Indians who are under European authority, as peaceable farmers, universally attain an advanced age, if the fondness for drinking, so customary amongst them, does not enfeeble their systems. Their intoxicating drinks are spirits made of sugar cane, maize, and the *Yatropa* root, and especially *pulque*, a wine prepared from the American aloe (century plant).

In the Mexican Indian have been remarked neither that variability of emotions, gestures, and features, exhibited by most of the Indians of North America, nor that activity of mind which so advantageously distinguishes the latter. He is serious, melancholy, taciturn, as long as he is not affected by spirituous liquors. He likes to be somewhat mysterious, even in his most indifferent actions; the strongest passions are never expressed upon his countenance, and it is frightful to see him suddenly change from absolute repose to violent and unbridled emotion. The Peruvian has more gentleness in his manners; the energy of the Mexican degenerates into roughness. The music and dancing of the Indians exhibit the total want of cheerfulness which characterizes them, and may be observed also in the whole of South America. Their singing breathes sadness and dejection. Women display more liveliness than men, but labor under the misfortune of subjection and of servitude, to which the female sex is doomed in all nations that have made but trifling advances in civilization. Females do not participate in the dance; they assist at this amusement of the men, only for the purpose of foretasting the spirituous drinks prepared by them. The Mexicans have preserved a peculiar taste for painting, and sculpture

in wood and stone. It is astonishing to see what they carve with a blunt knife in the hardest wood. They make, principally, pictures and statues of saints; and for three hundred years have servilely copied the models brought with them by the Spaniards at the beginning of their conquests. In addition to this, they show the same taste for flowers which Cortez found among them in his time. A bouquet was the most valuable present to the ambassadors at the court of Montezuma. This monarch and his forefathers cultivated a great multitude of the rarer plants in the gardens of Ixtapalapan. Cortez, in his letters to the Emperor Charles V., frequently extolled the industry displayed by the Mexicans in horticulture. No Indian sells any of his products in the great market of Mexico, without having adorned his booth with flowers, which are renewed every day. Every Indian has near his house a little garden, in which he raises an abundance of flowers, besides tropical fruits. The *Chinampas*, or floating gardens, look particularly beautiful. They are rafts covered with earth; some floating about on the lake, others fastened to the shore.

The dwellings of the Indians are simple and neat, but differ in form. In the hot region of the coast, they are a kind of cages, built of canes, or branches of trees and boards, here and there also of sun-dried bricks, and having flat roofs. Where the Indians are associated with Spaniards, especially in the neighborhood of Mexico, their houses are very similar to those of the latter. A few earthen jugs and bottles, a stone for the preparation of maize bread, and a multitude of representations of saints, constitute the adornment of the dwellings. A mattress spread upon the earth, or a hammock fastened to the ceiling, serves instead of a bed. Their villages and hamlets are often entirely concealed in the woods. Perhaps nowhere is there such a frightful inequality in the distribution of wealth, civilization, the cultivation of the soil, and the population, as in Mexico. In the interior of the table land there are four cities, distant from each other but one or two days' journey, and containing 35,000, 67,000, 70,000, and 135,000 inhabitants. The central plateau from Puebla to Mexico, and from thence to Salamanca and Zalaya, is covered quite as thickly with villages and hamlets as the most highly cultivated tracts of Lombardy. On the east and west of this narrow slip extend uncultivated regions, in which the population scarcely amounts to one person to the square mile. The metropolis and other cities have learned institutions, comparable to those of Europe. The style of the architecture of public and private buildings, the elegance of household furniture, the equipages, the luxury in female dress, the tone of society, in short everything, betrays a refinement strongly contrasting with the nakedness, ignorance, and rudeness of the common people. And this inequality of riches is found not merely among the whites, but amongst the Indians also. In general, the Mexican Indians present the picture of extreme poverty, and yet individuals are met with, who, in spite of the mask of indigence, have great wealth. Persons of the latter class are held in high respect by their countrymen; but, though wealthy, go barefoot, and wear the Mexican tunic of coarse, brownish stuff, like the poorest and lowest Indians. In the large towns, however, not only

in Mexico, but also in Puebla, Jalapa, &c., the dress is more complete ; the broad-brimmed hat and enveloping head-dress being probably copied from the Spaniards. (*Pl. 30, figs. 2 and 3, male and female dress of Puebla ; fig. 4, woman of Jalapa.*) The new order of things brought about by the separation of the Spanish colony from the mother country, has, it is true, improved the condition of the Indians, as it was really by their assistance that the subversion of the Spanish power was effected ; and this portion of the population, subjected to the greatest restrictions, and frequently treated with the most cruel severity, whilst Spain was mistress, under the constitution of the new republican states became citizens. Their rights of citizenship, however, are altogether nominal, and their moral and spiritual condition is still the same as under the predominance of the Spanish viceroys, whose policy in reference to the oppression practised by white masters and men in power upon the Indians, if abolished on paper, is still continued in fact.

If we glance at the former religion of the Mexicans, we shall find that it consisted of idolatry and sacrifices of the most cruel description. The priests of the idols were bloodthirsty, unfeeling murderers of human beings, who made the holy awe felt towards them by the people the means of gratifying their sensual lusts, their self-interests, and their fondness for carnage. The priest needed only to say that the god hungered, and sons and daughters had to be brought to the altar, or the prince was obliged to go to war and take prisoners. Victims obtained in either way were laid upon a black stone, and the priest with a sharp flint cut the palpitating heart out of the living body, in order to expose it reeking to the sun. (*Pl. 37, fig. 1.*) Their most important idol was *Vitzliputzli*, which was worshipped in a splendid temple, and to which offerings of the above description were made ; and another renowned idol, to which they did homage, was the god of the air, or *Quetzalcatl*, in honor of which curious dances and games were customary. In the latter even the kings took part, and in their most magnificent costumes ; whilst the common people were in the habit of disguising themselves as animals, for which purpose they had peculiar dresses of skins or feathers. The Mexicans are now converted to Christianity, it is true ; but the change has produced no other effect than the substitution of new ceremonies, symbols of a mild and humane religion, for those of a bloody worship of idols. This transition from old rites to new was the work of force and not of conviction, and Christianity was thus intermixed with the Mexican mythology ; a course of policy not only tolerated by the rulers and missionaries, but even favored to a certain extent, in order that in this way the introduction of Christianity might be facilitated. They persuaded the natives that the gospel had been preached in America even in very ancient times, and sought its vestiges in the rites of the Aztecs. We may account in this manner for the fact that the Mexican Indians, in spite of the obstinacy with which they cling to everything received from their fathers, easily forgot their former religious practices. They know nothing more of religion than the external forms of worship ; and being fond of ceremonies, take much pleasure in the Christian service. Church festivals, the

fireworks let off upon occasions of the kind, the processions, from which dancing and the quaintest disguisings are inseparable, afford a rich source of delight to the common mass of Indians. Christian worship, however, not merely in Mexico, but everywhere, has received shadings from the countries into which it has been transplanted.

With regard, finally, to the remaining population, the Europeans, but especially the pure-blooded descendants of the Spanish conquerors of Mexico, unquestionably hold the highest rank. Then follow the Africans, the negroes, who here are almost all free people, and in part marry amongst themselves. Indian women prefer negroes as husbands, not only to men of their own race, but even to Europeans, as the boisterous vivacity of the Congo negro suits them better.

Whites born in tropical countries, of European parents, or their descendants in pure lineage, are usually called *creoles*; descendants of negroes, *creole negroes*; the offspring of whites and negroes, *mulattoes*; of whites and American Indians, *red mestizoes*; and of whites and Hindoos, *yellow mestizoes*. The descendants of mulattoes are called *kaskes*; of a white and mulatto, *terzeron*; of a white and a terzeron, *quateron*. Children sprung from Europeans and aborigines of Brazil are called *mamelukos*; those from a Chinese man and a Malay woman, *tekos*; those from a Hindoo and a negress, *buganeses*; and finally, those from Hottentots and whites, *bastes*. *Pl. 30, fig. 1*, represents a Spanish creole, a Mayor of Jerez in Mexico; *fig. 7*, a mulatto woman of rank; and *fig. 8*, a Brazilian mestizo.

The Inhabitants of Central America.

The Republic of Central America (Guatemala), constituting the connecting link between South and North America, forms a curved, high, mountainous country, surrounded by the two great oceans and the two declivities of the Andes (Panama and Tehuantepec). Capes Honduras and Gracios a Dios extend into the Caribbean Sea, and Cape Blanco into the Pacific Ocean. The climate is warmer here than in Mexico, the soil more luxuriant, the productions richer. Of the population, two fifths are aborigines, two fifths mestizoes, and one fifth whites; besides many independent Indian tribes upon the entire west and northwest coasts, of whom the *Mosquitoes* in Honduras have intercourse with the English and Americans, but are mortal enemies of the Spaniards. The settled Indians, or *Indios ladinos*, are baptized, and like the Mexicans have adopted all the external rites of Christianity without having any idea of its spirit. Their costume is picturesque. Persons in good circumstances wear a cotton shirt, wide trowsers, leather sandals, and a girdle of colored stuff. The common Indians do not wear cotton fabrics, but materials woven of the fibres of the *agave* (*maguey*), and other plants. Gentleness, industry, taciturnity, hospitality, and veracity, are virtues for which they are celebrated; drunkenness, on the other hand, is their greatest fault. The industrial arts, agriculture,

and civilization, are yet in their infancy among them; nevertheless, they display so much desire for knowledge that the best is to be hoped for the future. *Pl. 30, fig. 5*, gives a representation of the dress of males, and *fig. 6*, of females, of Guatemala.

The Indians and other Inhabitants of South America.

The indigenous nations of South America have in some instances an olive-brown, in others a yellowish-brown color, passing by divers shadings into each other, or sometimes also into copper-red; the yellow complexion, however, predominates more among the eastern nations, the brown among the western and those inhabiting the interior of South America. According to Alcide d'Orbigny, the South American Indians are separated into three great classes, each of the two first of which, conformably to the diversity of language, is subdivided into tribes or branches:

1. THE ANDO-PERUVIANS, inhabitants of the chain of the Andes. *a.* the *Peruvians*; *b.* the *Antisans*; *c.* the *Araucanians*; and *d.* *Indians of Cundinamarca* (Republic of New Grenada).

2. THE PAMPANS, inhabitants of the great plain on the east side of the Cordilleras. *a.* The *Pampans proper*, so called after the large *pampas* or plains, that extend from Terra del Fuego to the interior of the country watered by the La Plata; *b.* the tribes of the *Chiquitos*; and *c.* the *Moxos*.

3. THE GUARANI-CARIBBEAN STOCK, being the aborigines of *Brazil*, *Guiana*, and *Venezuela*.

The *Cundinamaricans* of the mountains were found by the Spanish conquerors small and thick-set, copper-red; in the plains olive-brown; their forehead little elevated and retreating; the eye horizontal and never contracted at its outer corner, at the same time without any expression; the cheekbones prominent, the lips thick, the beard not apparent till advanced age. At the present time the Indians of New Grenada have the same appearance. The ruling nation were the *Muiscas*, who had founded the great Kingdom of Zaque, to which all the other nations from Los Pastos to Panama and the Gulf of Maracaibo were subject. They were more civilized than all other neighboring nations belonging to the kingdom; which is still the case at this day among the many Indian nations of New Grenada, who are distinguished by language, and by a settled or nomadic life, or as hunters and fishermen. At this time they are partly civilized, converted to Christianity, and distributed in Missions; in part savage, roving in entire independence through the primeval forests.

The following tribes may with tolerable certainty be included among the Cundinamaricans. 1. The *Muiscas* (*Muyscas* or *Mozcas*), in the department of Cundinamarca (Bogota, Mariquita), as well as upon the greatest part of the eastern Cordilleras, and the neighboring valley provinces of the Magdalena River. Settled farmers and herdsmen, proportionably of higher civilization than the other tribes. (*Pl. 30, fig. 11*, girl of Bogota.) 2. The

rude *Pantshes*, a nation surrounding the country inhabited by the tribe last named. In the coast country of the Caribbean Sea, between Rio Hacha and the Gulf of Maracaibo, the *Goahiros* (*Guagiros*, *Guajires*) and the *Cocinas*. The Muisca tongue is almost entirely extinct, and still fewer traces are found of the languages which were in use in the western districts of New Grenada, in Popayan, and as far as Darien; a region in which 52 different nations were formerly known, of which the southern and some of the eastern and northern were subdued by the sword, the remainder by missionaries. The missions known to us were among: 3. the *Andakies*; 4. the *Citaras*; 5. the *Chocos*, in the Province of Choco; 6. the *Guanacas*; 7. the *Neyvas*; 8. the *Cacanucas*; 9. the *Quaquas*; 10. the *Paes*; and 11. the *Timanaes*. The three last probably belong to the great nation of the *Guarani-Caribs*, as their names resemble those of tribes belonging to the Caribs living on the Orinoco. With still greater certainty may this be supposed of: 12. the *Urabas* or *Idibas*, the inhabitants of Darien; and 13. of the *Huaimies* or *Guaimies*, who inhabit the Province of Veragua of the Department Istmo.

The *Peruvian branch*, or the *Ando-Peruvian nations*, inhabit the greatest part of the old territory of the Incas before the Spanish conquest, that is to say, the Andes and their declivities, from the equator to Santiago del Estero in latitude 28° south. This territory embraces upon the mountains a part only of the Republic of Ecuador, the entire Republics of Peru and Bolivia, as well as a portion of the La Plata States. We may divide them into four nations:

1. *The Quichua*, or Inca nation, who at the time of the Spanish conquest were the rulers. The name *Quichua* appears to have formerly denoted a tribe merely, and *Inca* was applied to the royal family alone, and signified properly *king* or *chief*. Their princes were called *Capalla Inga*, that is to say, sole ruler. The complexion of the Quichuas is olive-brown. They are not large, have broad shoulders, very high and long chests, tolerably large heads, and small hands and feet; foreheads slightly arched, faces broad, more round than oval; noses prominent, aquiline; mouths rather large, projecting, without the lips being thick; teeth fine; eyes small or medium sized, never contracted at the outer corner. Eyebrows narrow and much arched, hair of a handsome black color, coarse, thick, and long. The expression of the countenance indicates equanimity, seriousness, and reflection. They are mild, sociable, peaceable, obedient to servility, firm and consistent, hospitable, but even at festivals taciturn and cold. Although they seldom forget injuries, revenge is but rarely taken, and homicide is hardly ever heard of. Under the old priestly reign of the Incas no trifling degree of civilization existed, to which numberless monuments, highroads, tombs, temples, and mines, testified, when Pizarro in 1525 penetrated into Peru. In the villages of the Peruvians of the present day most of the houses are round and composed entirely of stones more or less hewn, the seams of which are filled with earth and sods. The round pointed roofs are plaited of hay. The whole building consists of a single apartment, which, at the same time, is the kitchen and provision room. A hole two

feet and a half high supplies the place of a door into which the occupants creep, and also serves for the exit of smoke. Cactus trunks are used for beams and spars. Thongs of lama hide are used instead of nails. Upon a small heap of earth in front of every house a cross composed of two sticks is usually erected. Crosses are affixed in the interior also, the Peruvians being now Roman Catholics. In very ancient times they were addicted to the grossest idolatry. Some were cannibals; they lived mostly scattered upon the mountains and in forests, without agriculture, and the strongest and most daring was unlimited sovereign. In the warmer districts they knew nothing of dress; in the cooler, they clothed themselves usually in skins of animals. Idolatry was afterwards exchanged for a pure worship of the sun, the nomadic mode of life for the agricultural, when, as the tradition informs us, *Manco Capac*, and his consort *Mama Oello*, came as children of the sun from some distant country to the shores of Lake Titicaca, built the city of Cusco, and civilized the inhabitants. Other traditions relate the matter differently; all agree, nevertheless, in this, that the worship of the sun and civilization were brought into the country by foreigners, and that the first among them was *Manco Capac*. The chief inhabitants received the name and rank of Inca; and marks of distinction in clothing, and the decoration of the hair were allowed to them. Definite dresses were also prescribed to the other nations that were afterwards gained over to the worship of the sun, more by favors than by force. The chief priest at Cusco was always a brother or uncle of the king, and the other priests at that place were of the race of the Incas. Animals and plants constituted the offerings. The clothing of these Indians now consists of a tunic which falls half way down the leg, and breeches reaching to the knee. Upon the head is worn a cap, and on the feet sandals or *ojotas*, all of dark color, and a fabric of alpaca wool rather coarse in texture. They wear the hair long, hanging down behind in braids. The female dress consists of a woollen chemise, over it a tunic without sleeves, which is not sewed together at top, but the two lappets are fastened by means of two *tupus* or silver pins, and covered with a square piece of stuff pinned upon the bosom by another *tupu*. Their hair falls over the shoulders likewise, and their sole ornament consists of a necklace of precious stones. The clothes of the Indian women of Quito are rather different, as is shown by the representation (*pl. 30, fig. 13*), the figure exhibiting also the peculiar manner in which children are carried. The Spanish women of Lima are distinguished on account of a very close-fitting frock, a kind of mantilla, and apron reaching to the knee (*fig. 12*).

2. The *Aimara* nation, who, long before the erection of the empire of the Incas, had their residence not far from the shores of Lake Titicaca. At present they inhabit the entire plateau of the Andes, between latitudes 15° and 20° south, from the provinces Tinta and Arequipa to the basin of Paria and Oruro, between 69° and 75° of west longitude (from Paris), and their language has been so well preserved, that it is in use as the language of conversation, even in the cities, and by the descendants of the Spaniards, while the Spanish is spoken only in communicating with foreigners. Exter-

nally, however, they do not differ from the Quichuas, and in their disposition and customs also resemble the latter.

3. The *Atacama* nation (*Olipas*, *Llipi*) inhabit the whole western declivity of the Andes, between 19° and 22° south latitude (the entire provinces of Tarapaca and Atacama), and are likewise distinguished by their language.

4. In the region of the Pacific Ocean, between 22° and 24° south latitude, principally in the environs of the port of Cobija in Bolivia, live the *Chango* nation. They are somewhat darker, and have more of a blackish brown color than the Quichuas, and noses almost never aquiline. In disposition, they are mild, gentle, courteous, yielding, hospitable, and submissive to the laws of the land. They are engaged in fishing.

The *Pouquina* and *Yunka-Mochica* tongues belonged likewise to the general languages of the Empire of the Incas. *Yunka* signifies *hot plain*, and by it is denoted the seat of this nation, who were settled more especially in the valley of Chinchu, where their language is said to be still spoken. The *Pouquina* language was certainly in use in a few villages upon the small islands of Lake Chuquito or Titicaca, in the diocese of La Paz, and in some parts of the diocese of Lima.

The *Antisians* have extended their place of residence over the hot and damp regions of the eastern slope of the Bolivian and Peruvian Andes, from the projections of the latter at Santa Cruz de la Sierra, in 17° south latitude, in a northerly direction up to the equator. Their complexion varies, passing from olive brown to a very light color. Their forehead does not recede; the face is oval; the nose shaped in a variety of ways; the mouth medium size; the eyes do not stand obliquely. Their physiognomy expresses liveliness and gentleness, but has in it something weak. Of the different nations of this stock, the *Yuraccars*, *Mocetenes*, *Tacanas*, *Maropas*, and *Apolistas*, are known.

The *Araucanians* are brownish olive-colored, not very dark, robust; have a low forehead, round face, short, flat nose, eyes that are not oblique, medium sized mouth, thin lips, serious, cold physiognomy, and effeminate features. They dwell upon the western declivity of the Andes, from 30° south latitude to the extremity of Terra del Fuego, and from the upper valleys and plains east of the Cordilleras, between 33° and 42° south latitude, upon the mountains and their slopes. They continue in the condition of barbarism. We divide them into two groups.

1. The *Araucanians* or *Aucas*. To them belong the Araucanians in a still narrower sense, who dwell upon the west side of the Andes and in the mountains themselves. They lead a settled life, and may be divided into the *Chanos* (south of Valdivia), *Araucanians proper* (in the province of Arauco), and *Pelzuanches*. Besides these are the *Aucas*; that is, all the tribes that wander about the pampas. They are divided into the *Ronqueles*, dwelling in the pampas, and the *Chilenos*, who have their roving place around the sources of the Rio Negro. In their disposition, the Araucanians are proud, courageous, fickle, sly, resentful, not very cheerful, frequently taciturn. Indomitable warriors, indefatigable travellers, the Aucas, like the

Araucanians, are still quite as free as they were at the time of the conquest, and have never become converted to Christianity. The Aucas are constantly on the march, live under leather tents, and subsist upon food obtained by hunting or from their herds. Always on horseback, they are the best riders of South America. The Araucanians of southern Chili, on the contrary, have fixed abodes in the valleys, are engaged in the pursuit of agriculture and rearing cattle, and dwell in houses; but are quite as warlike as the nomadic tribes, and live in a state of perpetual hatred and warfare towards the Christians, to whom they have never become subjected, and also against the neighboring nations. They combine for the conflict, armed with their *bolas*, consisting of three balls attached to the same number of thongs, two feet in length, joined to a point. With these, and their slings, and spears fifteen to eighteen feet in length, sometimes with firearms also, and in company with their wives and children, they set out upon the route, under the direction of a great orator or chieftain, approach the place designed to be attacked, send out scouts to reconnoitre, and upon the following night suddenly rush upon the enemy. The women and children rob the latter of their cattle, and make booty of everything falling in their way. After the victors have killed the men, they carry off with them the women and children.

Their language is agreeable to the ear, and at the same time copious and very easy to learn. The domestic life and clothing of the Araucanians are very simple. The dwellings consist of wooden huts, which are covered with straw, have no partitions or windows, and are shut only by a door of ox-hide. A few benches and a table constitute the household furniture. Sheepskins are spread out instead of beds. Plates are made of wood or clay, the cups of horn. Men of consequence have better houses and furniture. The female dress consists of a long woollen undergarment without sleeves, fastened around the middle of the body. Over this hangs a small woollen cloak, joined in front by means of a broad clasp, mostly of silver. The long hair is bound in six braids, and around the head they wear bright-colored stones. Drops ornament the ears, rings the fingers, and parti-colored glass balls the arms and legs. Over the shirt men wear the *pongo*, a species of cloak reaching to the calves of the legs, and having at the top, in the middle, a mere opening, through which the head is thrust. With the *ulmenes* (princes), the dress is of better material. They wear hats with tufts of feathers and heavy silver spurs, and carry rods with knobs of this metal. With all this, they go barefoot like the rest. Their martial attire consists of a tabard and a helmet hood of strong ox-hide, frequently ornamented with handsome feathers. In Chili itself the Roman Catholic is the established religion. In the cities, as in every place in which Europeans have settled in America, European manners have been introduced. (*Pl.* 30, *fig.* 15, men and women of La Concepcion; *fig.* 16, girl of that place; *fig.* 17, a Chilian of the lower ranks.)

2. *The people of Terra del Fuego* inhabit all the coasts of Terra del Fuego and both sides of the Strait of Magellan, from Elizabeth Island and Port Famine in the east to the archipelago that fills up all the western parts

of the north and south sides of the Strait. From the Patagonians they are separated partly by the ocean, in part by the mountain chain on the isthmus connecting the peninsula of Brunswick with the mainland. Their mode of life and the glaciers of their mountain country constrain them to remain upon the coasts exclusively.

They are called *Pesherays*, and are described as being cold, poor, and wretched, like the nature of this region. Forster relates of them: "All other nations of the South Sea usually met us with a loud huzza or joyful exclamation, but the inhabitants of Terra del Fuego kept up a profound silence, even when close to the ship, where we expected at least an address; they uttered no other sound than 'pesheray.' When, after many signs, some of them were brought on board the vessel, they showed not the slightest indications of pleasure, and appeared also to be entirely without curiosity. They were short of stature, none over five feet six inches in height; had thick, large heads, broad faces, very flat noses, and the cheek bones under the eyes were very prominent. The eyes themselves were of a brown color, but small and dull; the hair black, entirely straight, anointed with train oil, and hanging wild and shaggy around the head. Instead of a beard, a few isolated bristles stood upon the chin. Their mouth was ugly and always open; shoulders and chest broad and strong; the lower part of the body, however, so meagre and shrivelled up, that one could scarcely imagine it belonged to the upper portion. The legs were thin and crooked, and the knees much too large. Their single miserable article of clothing consisted of an old sealskin, which was fastened around the neck by means of a cord. For the rest, they went entirely naked. Their complexion is olive brown with a copper colored tinge, and by many the hue is heightened by means of stripes of red and white ochre. The women were formed almost like the men, but were somewhat smaller and less ugly. Besides the word *pesheray*, at one time uttered in a complaining, at another in a caressing tone, some of them spoke a few other words." So far Forster's account. Later travellers have witnessed a rather greater display of interest in European ships, wares, and the like; they have also seen the *Pesherays* dance and heard them sing, and found them somewhat more conversible. Their food consisted of seals' flesh, frequently already spoiled, and greasy and disgusting blubber was their most esteemed article of diet. Their weapons, which consisted of bow, arrows, and a lance, gave the only proof of any reflection and of some industry. The *Pesherays* appear to pass in their canoes or rafts from one island to another, but nevertheless have their fixed places of abode. Their villages consist of a few huts of the rudest construction. A pair of poles being set upright, are bent towards each other somewhat in the form of a beehive, and covered on the weather side with grass, boughs, seal and other skins; the other side having an opening of about the eighth part of the circle as a door. Here also is the place for the fire, around which the family, in midsummer, sit trembling with the cold.

The *Pampans* are the inhabitants of the great plains or *pampas*. Their places of residence commence at the Strait of Magellan, in 53° south

latitude, upon the arid and cold soil of Patagonia, extend across the north-western pampas, and along the temperate, hot, and in part shaded plains of the River Gran Chaco, as far as the first hills of the province of Chiquitos, in 19° south latitude.

In general, these nations are brownish, olive-colored, or chestnut-brown; their medium size is five feet, two or three inches; their forms, however, are herculean; the forehead is arched, the face broad and flat, the nose broad and depressed, with wide, open nostrils; the mouth, at the same time, very large; the lips thick, very projecting; the eyes horizontal, yet sometimes contracted at the outer corner; the eye-bones projecting; the features manly and expressive, but cold, and frequently fierce. In almost every instance they are roving, martial, and often cruel tribes. We divide them into the following nations:

1. *The Patagonians (Tehuelches)*. They inhabit the southernmost part of America, from 40° south latitude to the southern extremity of this division of the world: a rough, barren country, in the southern half of which the weather is even more constantly and penetratingly cold than is the case in the most frigid regions of the north. But little is known of them; and that little—at least what has been mentioned of their extraordinary bodily size—appears to be undeserving of full belief. For centuries the Patagonians were the more important objects of curiosity, the more fabulous the notices of them given us by travellers. The first circumnavigators of the globe described them as true giants, of nine, indeed even twelve feet in height, colossally formed. Other travellers, on the contrary, asserted that they were persons of the usual size; indeed, even small. The Patagonians call themselves *Tehulhets*, and by the Spaniards have been denominated *Sierranes (Mountaineers)*. They are likewise split into numerous tribes. By recent travellers they are described as persons of from five feet six to ten inches (Paris measure) in height, and with their vigorous, broad-shouldered frame, the size of the head, and the thickness of their limbs, of course appear still larger. They are strong and corpulent, of dense muscle and firm flesh. At the same time, their figures are not disagreeable. Their face is round; the eyes are sparkling; the teeth very white. Their long black hair is worn fastened firmly upon the crown. Some men wear long, but thin mustachios. Their complexion is copper-brown. In point of size, the women bear a proportion to the men. Their complexion, however, is lighter. The attire of the men consists of a sleeveless coat, made of the skins of animals, thrown over the body, and bound around the waist by means of a girdle. A broad piece of leather is worn also around the middle of the body. Horse-hide boots cover the feet. They paint the face and body with bright colored lines, and ornament themselves besides with rings, bracelets, and strings of imitation coral beads. The dress of the women is much the same. In general, the Patagonians are described as good-natured. Their principal weapon is the ball-sling, which consists of two round stones connected by thongs, and inclosed by the latter in a net-like manner; but lances, bows, and clubs are also used by them. They are a wandering nation of hunters; pay no attention to agriculture, and live upon the flesh of wild

lamas, horses, ostriches (rheas), and other animals. The horse is everything to them; and their dwellings consist at the most of light tents of skins or rushes. (*Pl. 35, fig. 6*, huts and graves of the southern Patagonians; *pl. 33, fig. 7*, Patagonians in their camp.)

2. The *Puelches* dwell between the Rio Negro and the Rio Colorado; especially on the banks of the latter. 3. The *Charruas* east of Uruguay, north of latitude 31° south. 4. The *Mbocobis* or *Tobas* fill the greatest part of Chaco, in latitudes 21° to 32° south. 5. The *Mataguayos* from 22° to 28° south latitude. 6. The *Abipones*. 7. The *Lenguas*. 8. The *Payaguas*. 9. The *Mbayos*, and 10, the *Guaycoursos*. (*Pl. 35, fig. 3*, charge of horse by the Guaycoursos.) The latter are a tribe now almost unknown, who used to live on the banks of the Gran Chacos.

The *Chiquitos*, the American aborigines of the province of Chiquito, are light brownish olive-colored. Their medium height is 5 feet $1\frac{1}{2}$ inches; the figure moderately robust; the face full and round; the forehead arched; the nose short, and little flattened; the mouth moderate, with thin, small, projecting lips; the eyes are horizontal, sometimes moderately slit at the outer side; the cheek-bones not prominent; the features effeminate, and the physiognomy indicating vigilance, vivacity, and cheerfulness. We divide them into the following nations: The *Chiquitos*, *Samucus*, *Curaves*, *Tapiis*, *Corabecas*, *Saravecas*, *Otuquis* or *Otukes*, *Curuminacas*, *Covarecas*, *Curucanecas*, and *Paiconecas*.

The *Moxos* inhabit the province of Moxos; are olive-brown in complexion, but not very dark; their medium height is five feet, one inch, and eight lines; the limbs are robust; the forehead is slightly arched; the mouth of moderate size; the lips are somewhat projecting; the eyes horizontal and not slit; the cheek-bones not very prominent, and the physiognomy is mild. They are divided into the following nations: The *Moxos*, *Chapacuras*, *Cayuvavas*, *Pacaguaras*, *Itenes*, *Itonamas*, *Canichanas*, and *Movimas*.

The *Guaranis* or *Caribs*. This great stock displays in general a yellow complexion, intermixed with very pale red; the medium height is five feet; the forms are very massive; the forehead is not retreating; the face full and circular; the nose short and narrow; the nostrils are narrow; the mouth moderate-sized, not projecting, with small lips; the eyes frequently stand obliquely, and are always elevated at the exterior angle; the cheek-bones are not very prominent, and the features are mostly soft and delicate. The Guaranis, who might be called the Brazilian stock, after the country in which they more especially dwell, occupy the entire eastern moiety of South America, from the Antilles to the vicinity of the Plata river. The nations belonging here are so numerous, that we can select only a few of them. The principal nation are the Guaranis proper (*Tupi*, *Caribs*, *Caraiibs*), who in large numbers inhabit the entire eastern part of the southern half of the New World. Martius divides this great nation (that is, the part of it found extended over Brazil and over the borders of Bolivia, Paraguay, and Montevideo or Uruguay) into five groups and thirty-one nations, to which nine others may still be added.

The Guaranis are good natured, gentle, frank, hospitable, easily persuaded, and blindly follow a principle once embraced. Theft and adultery are so greatly detested as to be punished with death. They are as good fathers as they are husbands, and unacquainted with envy and malevolence. But it cannot be denied that they are cruel and bloodthirsty towards their enemies, and even kill and eat their prisoners of war. It is said, however, that cannibalism is not practised by all the tribes, and that it ceased with the conquest. The Guaranis are serious, but fond of games and festivals. Divided into small tribes and families, they always settle down on the shores of a brook, a lake, on the border of a wood; sometimes upon plains, at others in the thick of the forest. Usually they have fixed abodes, being at the same time farmers, hunters, fishermen, and sailors. The Guaranis take a second wife when the first grows old, but keep the latter in their house, and honor her as the most worthy. The weapons of the Guaranis consisted formerly of bow and arrows and a club; the latter in some cases round, and in others having cutting edges. Besides the manufacture of these articles, their industrial arts were confined to the building of huts and pirogues, as well as the weaving of their mats and parts of female dress. Much attention was paid to the fabrication of feather decorations, armlets, and leg-bands of different forms. The women made vessels for keeping drinks, and coffins for the dead, of clay. The same industrial arts, and the same usages, exist now also among the uncivilized Guaranis. At the present day (as they did formerly) the Guaranis go naked; or, when travelling, make use of a very scanty covering. Women sometimes wrap a piece of stuff around the hips. At the same time the Guaranis cover the body with black, red, and yellow daubings of paint, in such a manner that the half of the person is uniform in color. Only those who have become civilized are accustomed to dress themselves in light, loose garments. The chiefs of the numerous small tribes often obtain their rank by inheritance, but have no other rights than those of giving advice in peace, and heading the attack in time of war. Religion among the uncivilized Guaranis, like their manners, was and is simple, and quite as mild in its character as the disposition of some of the tribes. (*Pl. 37, fig. 2*, Guaranis in the forests of Paraguay as cannibals; *fig. 3*, the preparation of the *cacuin* drink among the same; *fig. 4*, war dance of the eastern Guaranis (*Tupinambas*); *fig. 5*, captives of the same, led to death; and *fig. 6*, funeral among the same; *pl. 32, figs. 6, 8*, civilized Guaranis of Paraguay and the province of Rio Grande.) The tribe of eastern Guaranis, *Tupinambas*, dwell principally along the sea-coast of St. Catharine's Island, to the mouth of the river Amazon.

Other nations of Brazil and Guiana, not belonging to the Guaranis, are:

The *Puris*, who formerly constituted one nation with the *Coroados*, but afterwards separated from them; hence, their customs are very similar to those of the latter. The *Coropos* and *Macuanis* belong to them also. The greatest part of the *Puris* have not been subjugated by the European settlers, but are at peace with them. They dwell on the upper course of the Paraiba, and in the interior of the province of Espirito Santo, between the river of the same name and the Paraiba, and with the *Guianas* on Rio

Iguassu and Rio Xipoto. (*Pl. 36, fig. 1*, dance of the Puris; *fig. 6*, duel of the same.)

The *Coroados* are still living in the forests of Rio Xipoto in the province of Minas Geraës, and as yet in a condition of semi-barbarism. The most civilized of those found between the rivers Macahe and Cabapuana are the tribe called *Goitacas*. (*Fig. 2*, drinking frolic of Coroados.) The *Coropos* dwell beside the Coroados, along the Rio Xipoto, in the Presidio de San Joao Baptista. The *Macuanis* are at present settled in part on the coast at Caravellas, partly in the neighborhood of the Quartel of Alto dos Boys, in Minas Novas.

The *Botocudos* or *Aymoris*, who call themselves *Engecrackenong*, dwell in the sixteenth century in the Captaincy of Ilheos, extending as far as Porto Seguro, where they carried on a cruel war with the Portuguese colonists; but are now found in the interior, upon a section of country running parallel to the Atlantic coast, and between the Rio Doce and the Rio Pardo, lying between 18° and 20° south latitude, mainly upon the Sierra dos Aimores. Their number amounts to about 4,000.

The *Botocudos* received their name from the Portuguese, from the fact of their wearing in the under lip and lobe of the ear pieces of wood resembling the bung of a cask (Portuguese, *botoque* or *batoque*). They live by hunting and fishing. A singular custom is the one just alluded to, that of piercing the under lip and ear lobe, and placing in the openings thick, round disks of wood. From time to time, when the apertures have become enlarged, the blocks are replaced by larger pieces, as it is considered a great beauty among them in case the wooden stoppers are very large. At last the under lip projects so far horizontally that it can no longer be moved upwards, nor the mouth closed. The ear lobes hang down so much that when the wooden stoppers are removed they almost touch the shoulders. In their native country, the complexion of the Botocudos is brown; it probably becomes darker by reason of the rubbing with oil and clay practised amongst them. The Botocudos appear to be even tempered, and at the same time timid. They have remained independent even until the present time, and are divided into different tribes, some of which evince a desire of cultivating friendly relations with the whites, and do not eat human flesh; whilst the principal tribe, which is addicted to this barbarous custom, is distinguished for cruelty and implacable hatred towards the European settlers; and, rendered sufficiently sagacious by misfortune, has, in spite of exertions and sacrifices on the part of the government, known how to maintain its freedom in the forests, and keep its original ground. How shamefully Indians are dealt with, is shown in the treatment of the Botocudos. The whites were not satisfied with shooting them down wherever they met them, but employed also the most disgraceful means in order to surprise them in their dwellings, and massacre them without mercy. Under assurances of friendship they enticed them to draw near, gave them food, and murdered them whilst they were eating. Indeed, they went so far as to hang up in the forests clothes of persons ill with the small pox, so that they might be found and put on by the Botocudos, and thus communi-

cate the disease to their fellows ; which soon effectually swept off countless numbers. Truly, under such circumstances it is not surprising that the Botocudos do not act less cruelly towards the whites.

All Botocudos are of medium size, thick-set, broad shouldered, and strongly built. In war, they steal upon their enemies in the manner employed by them when hunting game. Their weapons consist of a bow seven feet long, with arrows five feet in length. Their leaders are distinguished more by prudence in the arrangement of the battle, than by valor ; they do not even take part in the combat. Their prisoners are killed in order that the flesh may be eaten ; the flesh of negroes, however, is preferred to that of whites. The Botocudos appear to be particularly fond of the blood of the slain. On the whole, we have but few accounts of their customs and usages. (*Pl. 36, fig. 5, a*, single combat of Botocudos ; *fig. 5, b*, battle of women of this nation.)

Besides the above are the *Canarins*, *Machakans*, *Malalis*, *Patachos*, *Camacans*, *Paniames*, &c., as well as the *Capoxos* (*Capochos*, *Caposhos*), a nomadic tribe in the rocky mountain forests, upon the boundary between Minas Geraes and Porto Seguro (*pl. 35, fig. 2*, Capoxos shooting birds), the Sabujos, &c.

The *Camacans* have gradually accustomed themselves to fixed residences. Their skin has a handsome brown, often tolerably dark color. Their huts are constructed of laths, and covered with pieces of bark of trees. Around them they plant bananas, maize, manioc (the roots of which they eat roasted), and sweet potatoes ; honey is one of their most esteemed articles of food. Some skill in the arts is displayed by them. The women in particular are very dexterous in manufacturing cotton, the threads of which they understand how to twist in a very neat manner, so as to be able to make of them an apron, their only article of clothing. On festive occasions they wear besides a cap, called *sharo*, which consists of a cotton-thread net, trimmed with parrot feathers. Very neat vessels are made by them of clay. In case the spoils of hunting have been good, the Camacans are very much inclined to get up feasts, with dancing and singing, at which they go by turns to a cask and drink *caui*, a liquor prepared from maize and manioc by the women. (*Pl. 32, fig. 1*, Camacans in the forest ; *fig. 2*, the dancing and drinking feast just mentioned.)

In the province of Mato Grosso live the *Caupeses*, *Guajis*, *Cabijis*, *Parecis*, &c. ; upon the west side, in the eastern part of Campos dos Parecis, however, and upon the northern declivity of this table land, the *Maturares*, *Mambares*, *Ujapas*, *Mambriacas*, and many others.

In the province of Goyaz, and the neighboring countries, dwell the *Cayapos* (*Caipos*), *Aroes*, *Tapirakes*, *Chavantes*, *Cherentes*, *Puchetys*, *Carayas*, *Tapacoas*, &c. ; and especially the *Ges* or *Gez*, a great nation, of whom many populous hordes and tribes are known. They reside in the country between the Tocantins and Araguaia, to within 140 miles south of San Pedro de Alcantara, and extend their excursions frequently as far northwards as Para. Until the present time they have remained unsubdued, but isolated hordes have commercial intercourse with travellers. On account of their

savage, rapacious attacks, they are dangerous to the settlers. They are divided into *Norogua*-, *Apiña*-, *Canacata*-, *Manacob*-, *Poncata*-, *Paicab*-, *Ao*-, *Cran*-, and *Cricata-Gez*; the last called also *Falcon Indians*. The *Crans* (*Tumbias*, *Imbiras*) are unquestionably a branch of the *Gez*, and divided into ten tribes, whose hostile inroads are extended far into the provinces of Para and Maranhao.

In the provinces of Piahu and Maranhao, and in the interior of Bahia, dwell the *Acroas*, the *Masacaras*, *Jaicos*, *Pimenteiras*, *Chocos* or *Chucurus*, &c.

In Para, along the Rio dos Amazonas (Amazon river), live, upon the south side of the stream, the *Coyacas*, *Ammarious*, *Tacuhunos*, *Jacundas*, *Pirikitas*, *Muras*, and others; upon the north side, the *Amicuanos*, *Armbutos*, *Tucujus*, *Wayapis*, *Aracujus*, &c.

In the province of Rio Negro we find the *Puru-Purus*, *Wamanis*, *Marawas*, *Catawijis*, *Catukinas*, *Canamering*, and others, who live on the Solimoes and its southern tributaries; between the Solimoes and the Rio Negro, the *Cawijanas*, *Pavianas*, *Caca-Tapwujas*, &c.; further, the *Jumanas* (*Xumanas*), on the Iça, between this stream and the Joami and Pureos, whose hordes are the *Carwana* (*Charruas*, pl. 36, fig. 4), the *Warawama*, and others. Allied to them are the *Mariaranas*, between the lower Yupura and the Rio Negro, and the *Wainumas* between the Upi, a tributary of the Iça, and the Courinari, which falls into the Yupura. The *Yuris*, between the Yuri and Iça, probably belong here also. Other nations of this district are the *Coretus*, *Airinys*, *Yucunas*, *Miranyas*, *Umawas*, &c. Northwardly and northeastwardly of the Rio Negro dwell the *Turamas*, *Manoas*, *Bares*, *Yabaynas*, *Curanoas*, *Carajas*, &c.

The tribes of the Orinoco, its branches and tributaries, are likewise numerous. A. von Humboldt, in the account of his travels, has noticed 120 tribes in alphabetical order; and in addition, twenty-six of British, Dutch, and French Guiana. But as all these tribes do not differ essentially in their modes of life, our limited space will not permit a full enumeration of them. We will now close, therefore, the consideration of the Indians, and add a few remarks in reference to the remaining inhabitants of South America.

The occupations of the Europeans in Guiana consist chiefly of the cultivation of plantations, and of commerce. To be a merchant, owner of a plantation, director, and administrator, is here considered the height of man's ambition, and every white is animated by a mere commercial spirit. Sciences and arts are little cultivated, and instruction therein is esteemed only a secondary matter in the education of youth. The French are the worst of colonists; for which reason, also, their colony, founded in 1626 by merchants of Rouen, has never flourished, although possessing the same natural advantages with the rest of Guiana. The colonies of British Guiana, Essequibo, Demerara, and Berbice, were founded by the Dutch, and conquered by the English. Demerara, inhabited mostly by Dutch, is the principal and most flourishing amongst them. Here, as in all colonies, the English live in grand style; rise at six o'clock, drink coffee or chocolate;

breakfast at ten upon meats, fruits, wines, and the like; at five o'clock dine richly in the society of the great, and spend the evening on 'Change, in the coffee-house, at play, balls, and entertainments.

Dutch Guiana, cut into two parts by the river Surinam, from which stream the entire colony takes its name, is one of the finest colonies in the tropics. The life of the inhabitant is as follows: At six o'clock in the morning, he appears in his dressing-gown under the balcony of his house, where he receives the reports of overseers of the plantation, and gives orders. A negress hands him a cup of coffee, and a negro boy brings cigars, tobacco, and a bottle of wine. At nine, he returns to his chamber—which has been scrubbed with limes in the meantime—in order to wash and dress himself. At about eleven o'clock appears a breakfast of meats, vegetables, and fruit, with the addition of wine or beer, and water. At twelve, he rides to the plantation, accompanied by a negro slave with cigars. At three o'clock, he takes his dinner. After the siesta, he drinks his coffee, smokes, walks, and passes the evening in games, boating excursions, assemblies, and concerts.

The white inhabitants of Quito are of medium size, have expressive features, fine color, and slender waists; and their sparkling eyes betray the vivacity of their spirits. In social life they are very kind, frank, loquacious, and hospitable. The women are of very variable dispositions, and enjoy high respect. The ladies of Guayaquil are celebrated for their great beauty; having fine features, slender waists, a pretty gait, and a great deal of grace. They are said to be particularly good dancers, intelligent, and witty. The ordinary dress of the Spaniards and Creoles is similar to that of the English and French, to which is added a blue, white, or red cloak. Hoop petticoats are now worn by old ladies alone; by young ladies, at most only in church. The *mestizoes* are very well formed, tall, slender, vigorous, of a reddish tinge, and have prepossessing features. They are said to have many virtues in common with the whites; they exceed them, however, in their vices. Their style of dress is inferior to that of the Creoles. They are fond of going barefoot. Knee breeches, a narrow jerkin, blue Spanish cloak, and black straw hat, constitute the clothing of the men. Women still frequently wear the stiff hoop petticoat, with it a tight bodice, and over their shoulders hangs a small flannel shawl; the hair falls down on the neck in long locks; a net covers the head; a multitude of ribands, fringes, laces, and brooches, complete their attire. The national pleasures of the inhabitants of Quito are bull fights, masquerades, dancing, and music; and their fondness for the latter is gratified also in the religious ceremonies, processions, and parades.

Among the whites of Brazil, the Portuguese play the first part. Pride and indolence are faults laid to their charge, but they are very temperate in eating and drinking. The Brazilians dress in the English fashion, and live in Oriental style. The indoor attire of women is a thin garment of the finest muslin or cambric, one shoulder being uncovered. When they go abroad or are carried to pay visits, they throw around the person a long black silk mantilla, which goes over the head also. They are surrounded by black

female servants, who live with them upon the most confidential terms, but are frequently obliged to endure the harshest treatment. Among the whites of Brazil, the inhabitants of the province of San Paulo are chiefly distinguished as an entirely singular, vigorous race. We find these people, who first unveiled the riches of the country and discovered the gold mines and diamonds of Brazil, scattered throughout the entire kingdom, and recognise them in their enthusiasm for great things, in their inclination for adventure, and in their rather rough but strong voice. The Paulistas are celebrated as well for their beauty, as on account of their good nature and fidelity. In disposition the Brazilian is more lively and fonder of pleasure. In the evening the notes of the guitar are heard almost everywhere, to which instrument the people sing and dance. Their national dance is called *baducca*, and performed by but one man and one woman, who, snapping their fingers, trip with unrestrained movements, at one time towards, at another from each other. This amusement is frequently kept up for a long time to the monotonous sounds of the instrument mentioned above, alternated with impromptu singing or national songs. Landed estates, with their farm-houses and plantations, are denominated *fazendas*, and the proprietors or planters themselves are called *fazendeiros*. Every *fazendeiro* possesses several hundred and even several thousand head of cattle, all roving freely over the pasturage. To every cattle *fazenda* belongs a sufficient number of *vaqueiros*, who take care that the animals of the herd are not dispersed out of the district. The *vaqueiros* are clothed entirely in rough skins, ride good horses, and are furnished with a long pole with a blunt iron head, to keep the oxen from pressing too closely upon them; they generally carry also a noose with which to catch the animals. They are good riders and horsebreakers withal. (*Pl. 31, fig. 1*, Brazilian country people of Rio Grande upon a journey; *fig. 2*, inhabitant of the Province of Minas travelling; *fig. 3*, planter's family of Brazil driving to mass; *fig. 4*, townspeople of Rio Grande journeying; *fig. 5*, caravan of travelling Brazilian merchants; *fig. 6*, transportation of diamonds with the escort. *Pl. 35, fig. 4*, cattle-hunting in the Brazilian pampas. *Pl. 33, fig. 1*, Brazilian planter's dwelling; *fig. 4*, game of *Loss-Porodos* of Brazilians; *fig. 5*, *baducca*, national dance of the Brazilians; *fig. 6*, planter's family walking to mass. *Pl. 32, fig. 5*, inhabitant of the Brazilian Province San Paulo.)

In Peru also, the Creoles are lively, agile, and kindly disposed. Conjugal and parental fondness, filial love, charity, generosity, and hospitality, are found as a general rule in the households of the Creoles. Their pride is skilfully concealed under the appearance of affability, and their main fault is an inordinate longing after enjoyments, especially an unbounded love for the pleasures of the table. The dress, particularly in Lima, the Paris of South America, is handsome and picturesque. Men wear the Spanish cloak; women of all classes, under the cloak, the *saya*, a garment of velvet, satin, or stuff, mostly black and cinnamon-brown, but with ladies of higher standing red and light blue, gathered in very small plaits and fitting tight around the body, very narrow below and trimmed with fringe, pearls, and embroidery. Silk stockings and satin shoes, a handsome shawl, and a light

loose garment of thin black silk, make up the attire. Perfumes and scented waters are great favorites with the ladies; they also adorn themselves richly with precious stones and flowers. The manner of living in *Bolivia* (Upper Peru) is still very plain; the character of the people, like their customs, is steadfast and honorable. In mental culture and religious enlightenment they are nearly like the Lower Peruvians. (*Pl. 30, fig. 12*, female dress in Lima; *figs. 9 and 10*, female and male dress in Bolivia.) The Spaniards, met with in small numbers in Chili, have laid aside their pride. The Creoles, fiery and spirited in this country as everywhere, are in possession of the greatest part of the landed property and the public offices. Among the men, European dress is in use; a *poncho* (cloak), however, is sometimes worn. Women wear fancy-colored bodices, and a frock of colored flannel or black velvet over a hoop petticoat, frequently of immense size. When going abroad they put on a man's hat, covering it with a muslin shawl. Young girls, however, usually wear the dress of Lima. (*Pl. 30, fig. 15*, men and women; *fig. 16*, girl of La Concepcion; *fig. 17*, Chilian of the lower ranks.) A peculiar class are the Spaniards who inhabit the central plains of the pampas, and who are true Bedouins. They are called *Gauchos*, and live dispersed in the desert. Every Gaucho, a man often sprung from noble Spanish families, is patriarchal lord in the midst of his farm. His hut is surrounded by an inclosure for the herds; his bed consists of skins, his clothing partly of the same material. The only food is beef roasted on a spit over the fire. Vegetable diet is despised; and cheese and butter are not made by them. They are scarcely more civilized than the savage Pampan Indians, who sometimes rob them of their cattle. In love of liberty as well as in bodily activity, the Gauchos resemble the Arabs; that gentleness of manners prevailing in the tents of the latter is sought in vain, however, among them. They are gloomy, suspicious, and indolent. Only when engaged in breaking in horses or in ferocious fighting is their eye animated. Not a step is taken on foot; they carouse on horseback before the doors of the taverns when in town; even mass is heard by them in front of the open door of the chapel without dismounting. Card-playing and singing to the guitar are their principal recreations. They are excellent soldiers, and endure extraordinary privations. Of late years they have frequently been the instruments in the hands of designing party men for the attainment of the revolutionary objects of the latter, and under the hands of these savages the noblest chiefs of the republic were wantonly sacrificed.

Argentina is superior to the other republics of South America, in possessing by far the best educated city population. This is especially the case with regard to Buenos Ayres, one of the handsomest and most important commercial cities of South America, exhibiting a Moorish character in its architecture. Assumptions by privileged classes are seldom remarked here. The very first officers of the state live unostentatiously and very plainly. No restraint is imposed upon the women; they are virtuous and respected. Citizens live very well, but temperately, regularly attend their magnificent churches, and are very sociable. A strong intermixture of Indian blood is

perceptible in the population, which includes a large number of civilized Indians. Many French and English, especially artisans of the latter nation, reside there also. The streets are constantly occupied by Gauchos on horseback, who with their grotesque appearance, their dusky sunburnt countenances, their straw hats, ponchos fluttering in the breeze, Patagonian boots, and rude horse trappings, make a singular impression on foreigners. (*Pl. 30, fig. 18, a Gaucho in Buenos Ayres.*)

We close this subject with a few remarks concerning the journey across the Cordilleras. The passes of these mountains, which cannot lay claim to the name of roads, are impracticable for six months at a time. Only from November until the end of May can the perilous journey to Chili be ventured upon, and then only on mules. These animals are justly preferred to horses in these mountain tracts. The traveller's best course is to resign himself to the unerring instinct of his mule. It is his business, on the other hand, to retain his self-command, and not to allow himself to be overcome by fear when the animal he is riding stands still over dizzy gulfs in order to breathe and look for firm ground. Food and other necessary requisites are carried by the muleteers and peons (*pl. 30, fig. 14*), who accompany the traveller. The nearer he comes to the summit of the Cordilleras the more oppressive is that painful sensation designated in Chili by the name of *puna*, which is caused by the rarefaction of the atmosphere and upward motion. Arrived at the top, he casts a last glance upon the plains of the Rio de la Plata, which spread themselves out to view in the far distance. The desert with its dazzling snow and perpetual silence, opens before him; it must be traversed. Silently he bridles his mule and follows his guide. Like the latter, he bows before the wooden crosses past which the road leads, and which mark the sites of former casualties. If a tempest bursts forth, the caravan flies, if possible, to one of the miserable huts erected at certain points by the guides. Here the party are obliged to await the end of the storm, frequently abiding several days, their provisions, their strength, and their courage, being wasted in the meantime. The pass of Uspallata, the one usually chosen by merchants, extends from 800 miles west of the confines of Chili to Villa Vicencio in the Province of Mendoza. The journey through it is made in seven to eight days. The house in which travellers abide a few days is 1987 toises above the level of the sea.

We cannot leave the subject of the people of America without advert-
ing to the African race, who form part of the population both in North
and South America, mostly in a state of bondage, and who are employed in
the warmer temperate and in the torrid zones as tillers of the soil which is
owned by their masters, and as domestic servants. They are bought and
sold like other property; and forming a very considerable portion of the
wealth of their owners, will probably for generations to come remain slaves,
until finally some wise man contrives a way of emancipating them without
ruining at the same time the very existence of the districts in which, in the
present condition of things, their labor cannot be dispensed with, however
violently abstract philanthropy may argue to the contrary. Setting aside

this question, which does not fall into our province, we only mention the negroes of the southern United States, Central, and South America, with regard to their physical and moral condition. They are generally a healthy, cheerful race, kind when well treated, but savage when driven to despair by wanton cruelty, such as has been perpetrated sometimes in Dutch Guiana and Brazil, and which has led to bloody revolts, and subsequent independent settlements of the negroes in the forests and mountains of those countries.

The independence of the colored population of the Island of Haiti was accomplished by the negro general Toussaint l'Ouverture, after a series of revolutions, characterized by the most atrocious cruelties, and extending over four years (1791-1795). Several attempts have been made since to re-establish slavery, but unsuccessfully. The negroes remain not only free, but even masters of the island, and have alternately had governments of republican and monarchical forms. They have not, however, realized the hopes entertained by their friends, with regard to their capacity for administering the affairs of the island, which, when it came into their possession, was the most flourishing in the West Indies. They exhibit an invincible physical and mental indolence, caring only for sensual enjoyments; and the natural consequence is, that agriculture and commerce have suffered considerably since the departure of the white population. At present, they are under the sceptre of the self-installed Emperor Faustin I., with a newly formed aristocracy; and it remains to be seen if the wisdom which is inherent to crowned heads will save the country from all the difficulties into which it has gradually been brought, and which for the time being have a very threatening aspect.

On the British West India Islands the slaves were emancipated by act of Parliament in 1838, the greater part of a century having been spent by the friends of this measure in urging its policy. The negroes and colored people generally in the British possessions have equal social rights with the whites, being like the latter subjects of the crown of England. Too little time has elapsed since their liberation and consequent adoption as citizens to allow of conclusive judgment upon the working of a system, of which the introduction was marked by great disturbances owing to the unwillingness of the emancipated slaves to work even for pay. This state of things has now ceased to exist, and the colored people appear to have become gradually familiar with the fact that a freeman has duties as well as rights. The produce of the islands, however, is still far inferior to what it was in the days of slavery, and the value of property is much depreciated.

Owing to their position, the negroes in America are mostly as ignorant as their kinsmen in Africa to whom civilization has not as yet penetrated. In the northern United States, where the negroes are free, individuals are, however, found among them, who possess no inconsiderable degree of education, and give evidence that the race are capable of receiving instruction under circumstances favoring its acquisition. Yet their condition is by no means enviable, owing to the reigning prejudice which forbids colored people to live on a footing of equality with the whites. The treatment of the

slaves in the United States is mild and kind, and great attachment is frequently observed to exist between master and slave, especially domestics and such as have been born and reared on the estate. In South America the slaves are treated less humanely, often even with great cruelty; but there can be no doubt that an improved political condition would be the source of improvement in the social condition of the slaves. As yet scenes like those represented in our plates are not unfrequently witnessed in Brazil. (*Pl. 34, fig. 1*, a slave trader; *fig. 2*, the punishment of the stocks; *fig. 3*, the scourge. *Pl. 32, fig. 4*, a free negro bringing back a runaway slave; *fig. 3*, negroes of Bahia. *Pl. 34, fig. 4*, negroes employed in the preparation of manioc flour; *fig. 5*, others returning home from hunting; and *fig. 6*, others, again, as porters. *Pl. 31, fig. 1*, two sedan bearers, and with them travelling farmers (*sertomejos*), of the Brazilian province of Rio Grande. *Pl. 35, fig. 5*, negroes of San Paulo dancing. *Pl. 36, fig. 3*, dance of Indians in the mission of St. John. *Pl. 33, fig. 2*, diamond dealer, and *fig. 3*, negroes as diamond washers.)

Diamonds are searched for by negro slaves, under strict supervision; in doing which they make use of the same kind of box employed in washing for gold. When a diamond is discovered by one of them, in the sand brought up from the bed of the river, he rises from his seat, and claps thrice with his hands. As long as the washing continues the overseers follow vigilantly the movements of all the slaves, lest they should embezzle any of the diamonds. Still, in spite of this strict supervision and the severe punishment which they have to expect upon discovery, they understand how to conceal, during the washing, between the fingers or toes, in the ears, in the mouth, in the frizzled hair, &c., the diamonds found by them.

In the preparation of flour from manioc (*Jatropha manihot*, *pl. 34, fig. 4*), the roots of this plant are first scraped, in order to free them from the bark. They are then held on a large revolving wheel, and by this means ground to a jelly. After this, the mass is placed in long wide hose, plaited of reeds and bast, which are hung up and drawn out, thus making them narrower, and pressing out the juice of the mass. The remaining pulpy mass is thrown into large pans of copper or burnt clay set in mason-work, in which it is fully dried by heat, being constantly stirred in order that the mass may not burn. Of the meal thus obtained a savory bread is baked, which keeps for months.

THE NATIONS OF OCEANIA.

Oceania, spread over a greater portion of the earth's surface than the other four divisions of the world together, is the least known of all, but the richest and the most remarkable in the variety of objects presented to view. It might be termed the region of wonders. It contains the most opposite races, the strangest productions of nature, and the most remarkable monuments of the arts. Oceania consists of islands merely, the largest of which, situated to the south-east of Asia, is not unfrequently considered a continent, on account of its magnitude. It is called New Holland or

Australia, and has been taken possession of by England, whose government is now endeavoring to increase the population and render the country more profitable, by means of European settlers. The south-eastern portion of this vast island is called New South Wales; many settlements exist there, as well as upon the eastern part of the south coast, the west and north coasts. The whole of Oceania has been divided in different ways; one of those most natural appears, however, to be that of Domeny de Rienzi, improved by Dumont d'Urville: 1. *Malaysia* or *West Oceania*, improperly denominated by the English the Indian Archipelago, with Borneo as a centre; 2. *Micronesia* or *North Oceania*, comprising the very small islands and naked rocks in a space extending from a little below the Tropic of Cancer in the south to 40° north latitude, bounded on the west by the Island of Borodino, on the east, at about 167° west longitude (from Paris), by Neker Island, the most important part of it being the group of Munin Sima. 3. *Polynesia*, consisting of the St. David or Free-will Islands, Nevil Island, the great archipelago of the Carolinas, including the Pelew and Navigators' Islands, the large island of Cocal, and others of this chain; in general, all the islands of the South Sea, from the Hawaiian or Sandwich archipelago to the Bishop and Clerk Islands, south of New Zealand, to the Island of Ticopia near Vanicoro, in the west, and to the island of Sala y Gomez in the east, in the direction of America: 4. *Melanesia*; that is, Australia with the archipelago belonging to it, Van Diemen's Land, New Caledonia, Malicollo, &c., New Guinea and the adjacent Papua Islands, and all the islands to the east and south-east with a black population, *e. g.* Solomon's and Viti Islands, New Ireland, New Britain, &c.

The possessions of the Dutch in Malaysia number about 10,000,000 of inhabitants. Portugal holds the north-eastern part of the island of Timor, and the two small islands of Sabrao and Solor. Spain owns the greatest portion of the Archipelago of the Philippines, and is endeavoring to enter into the interior of Leyte, Samar, Mindora, Mindanao, and La Paragua or Palawan. England possesses Pulo Penang and Singhapura, Melville Island, north, Norfolk, east, Tasmania, south of Australia. She holds the entire east coast, or New South Wales, and some points in the south, west, and north of this great island or continent, which is almost as large as Europe.

The Malays are the race most widely spread in Oceania. In all probability the east coast of Borneo is the native place of this seafaring and commercial people. They conquered and gave their name to the peninsula of Malacca, and the east coasts of Madagascar and Formosa were probably colonized by them. The coasts of Sumatra, a part of the Moluccas and of the Nicobars, Pinang, Nias, Singhapura, Linging, Bingtang, &c., are inhabited by this stock. The Malays are well formed, of medium thick-set stature, little inclined to corpulency; their feet small. Upon almost all the shores of West Oceania, where they have settled, they appear to occupy the middle position between Hindoos and Chinese, but their complexion approaches the dark brick-red of the Illinois and Caribs, and sometimes inclines to white or black, according to the intermixture of nations. In Timor, dark and tan-colored faces are seen; in Borneo, the complexion is

clearer ; in Ternati, it is deep blackish brown, and inclining to sooty. The Javanese and Balias are in all probability mongrels of Borneese and Hindoos ; the former being of a yellow tinge, the latter whiter and better formed ; both inferior to the Malays. The ugliest race is found in Linging, the handsomest in Mindanao ; the bravest Malays are those of Palembang. The women are tolerably pretty, delicate, and agile ; in Manilla and Formosa they are almost white. Their facial angle is of 80° to 85° ; their nose is short, thick, and sometimes flat ; the mouth, even of females, very wide. Chinese have settled upon almost all the Malayan islands, and intermarried with women of the country ; and to this intermixture of races may be attributed the fact that many Malays have deep set and oblique eyes, like the people of China. Nowhere, excepting upon Wayoo, was the effort to spread the Chinese tongue successful, so greatly is it disliked by these natives, whose language is soft like the Italian and Portuguese. Their food consists of sago, rice, and fish. Some chew a mixture of betel, pepper, quick lime, areca nuts, and tobacco, called in Java *siri* ; others use gambir or kino, a very astringent substance, made of the *Nauclea gambir*, a large creeping plant. The latter gives a black color to the teeth, tongue, and roof of the mouth, without affecting the gums. Betel chewing is customary also in the East Indies and many other regions. Upon the islands of Linging, Langan, Bingtang, Singhapura, Pinang, Sumatra, Java, &c., the people never go naked, but throw a *sarong* (a kind of tunic) around the body, and wear an undergarment, and a cap or cloth wrapped about the head. In Java the *Orang Kaya*, or nobleman, adds a cloak, and sometimes a cap called *kuluk*. The priests alone are clothed in white, and have a kind of turban. Many of the Malays are Mussulmans, but do not shave the head entirely. They are fond of a life at sea, and among other things follow piracy ; are industrious artisans and skilful merchants. Proud and jealous, licentious and faithless, but brave and independent, they go constantly armed with the *kris* (javelin), except in the towns ; and this weapon is frequently poisoned with the fearful *Upas*.

The second stock are the *Polynesians* and *Dyaks*. De Rienzi thinks that he discovered in the race of the Dyaks and other people of Borneo, the origin of the Malayan, Melanesian, and Polynesian nations. The light yellow, more or less embrowned, complexion of their face ; their facial angle, which resembles that of Europeans ; the tall stature, regular physiognomy, high nose and forehead, and long black hair ; the beauty, sweetness, and the insinuating and voluptuous manners of the women, especially of the dancers ; the traceable similarity of their language ; the habits of agriculture, hunting, and fishing ; the skill in manufacturing their pirogues and utensils ; their huge huts ; their religious conceptions ; the human sacrifices ; their usages, and the peculiar kind of consecration or *taboo*—all these things, says Domeny de Rienzi, show a very great affinity between the Dyaks and the Polynesians. Still more complete was the agreement between the latter and the Touradashas and the Boughuis of Celebes, who, if they did not actually belong to the stock of the Dyaks, at least like them respected the property of the great and priests as sacred and inviolable.

The Balias, the natives of the islands of Nias, Nassau or Poggee, the Ternaties, the Guilolies, and the inhabitants of a part of the Moluccas, the Holo Archipelago, the Philippines and Palaos islands, appear to belong to the Dyak race. According to the assurance of credible travellers, the resemblance of the Tahitians, the New Zealanders, and the Battas to the Dyaks is surprising. Their language is, as it were, the connecting link between the Malay and the Polynesian; and the Malays and the Javanese on the coasts of Borneo acknowledge them as the aborigines, the *Orang-Benoa* of the country. All Polynesians are unacquainted with the use of the bow as a weapon of war; all partake of the intoxicating drink *kava*; among some civilization has made considerable advances, especially among the inhabitants of Hawaï, Tahiti, and Tonga.

The third division are the *Alfuras*; a name which, in the language of the Dyaks, signifies a savage race, and which the Malays do not apply to nations of one color, or pure black alone, but to various tribes living in a state of nature. The Alfuras of Booru are copper colored; the *Battas*, or Alfuras of Sumatra, dark yellow; and the *Touradshas*, or Alfuras of Celebes, resemble the latter; whilst the Alfuras of Mindanao, Mindora, &c., are of a dusky black, and those of Luçon and of Buglas, who are mongrels of the Endamenians and Papuans, present two black shadings. In all probability the blacks formed the original population of Oceania. It may be that the Alfuras belong to an Endamenian stock, who, after having been expelled from Borneo, spread over the greatest portion of this Archipelago. Borneo, however, contained a tribe of Papuans also, who in the beginning lived upon this island alone, vanquished the Endamenians, almost extirpating them, and subsequently invaded the coasts of the neighboring islands, driving back the remainder of the Endamenian population into the interior of the countries, until they themselves succumbed to the Malay tribes. In the interior of the country both stocks are frequently seen intermingled.

The *Igolotes* (*Papuans*) are of yellowish black color, and predominate in a great portion of Melanesia. On the island of Borneo, whence they spring, and where they still exist, they are also called Dyaks. Mixed or distinct, but at all events inhabitants of the same soil, the Papuans and Endamenians are still masters of a part of Luçon, Mindora, Buglas, Mindanao, Timor, Sumatra, Celebes, and Java, some districts of Madagascar, and the interior of Formosa, &c.; and are known in the different places by the different names of *Aëtas*, *Nequitos*, *Negrillos*, *Zambales*, *Finguianes*, *Italones*, *Kalingos*, *Igorrotes*, *Orang-Karbec* (in Sumatra), and *Binzimbab* (in Madagascar). The Papuans are blacker than the Endamenians and the Shangallas of Abyssinia, to whom they are very similar, except with regard to the hair, having the same rounded form and agreeable physiognomy. The pirogues of the Papuans of New Guinea and all the islands of Melanesia are formed in the same manner, a fact indicating a common origin of the inhabitants. By stature they are rather tall; their skin is black and shining, passing into yellow; their facial angle has 63° to 69° ; their hair is black, neither smooth nor frizzled, but woolly, tolerably fine, and much curled in front, which gives the head a monstrous appearance. They are seldom

tattooed, and with few exceptions go naked. Among the numerous varieties of the Papuan stock, that of Viti appears to occupy the principal, that of Van Diemen's Land and Mallicolla the lowest rank. From a mixture of Malays with Papuans arose a mongrel people, who have been denominated Papuans also, but might with much greater propriety be called Papua-Malays. The usages of both stocks prevail amongst them; some are Mahomedans, others idolators; and their language is rich in Malay words. Their stature is small; and their facial angle is at the most 64° to 69° . They inhabit the coasts of Wayoo, Saluati, Gamen, and Battanta, and northern New Guinea from Cape Sabelo to Cape Dorey.

New Guinea or Papuasias is the centre of Melanesia; Borneo the place whence the inhabitants originally came. All the natives of Melanesia are more or less yellowish black; but a stock occurs differing as much from Papuans as do the Bushmen from the Caffres. They inhabit the interior and probably the south of New Guinea, and are denominated Endamenians, owing to their great resemblance to the ugly negroes of the Endamena islands. At one time they must have been very numerous in New Guinea, but have now become rare, by reason of the perpetual persecutions and wars of the Papuans, who excel them in bravery, and are both bodily and mentally superior to them. Most of the Endamenians seen by Europeans are captives designed for sale. They are less black than the negroes of Africa, but yellower than the Papuans; and this yellow inclines to a dull, sooty brown. Among many tribes, the complexion has more of a faint yellow than black hue; the cranium is tolerably round; the forehead retreating; the hair woolly, and mostly frizzled. Their arms are very long; their legs thin, and still longer, often covered with hair. They have a huge mouth, a very broad and depressed nose, wide nostrils, and somewhat projecting, but beautifully enamelled teeth. The lower jaw is prominent; the countenance has a repulsive, animal appearance; and the facial angle is very acute, and of not more than from 60° to 66° . These Endamenians have also been denominated the Australian or New Holland stock; and occur unmixed, not merely in Australia, but also in New Caledonia, and on most of the Spirito Santo islands. They will be presently mentioned more fully. Our object here was merely to give an outline of the nations of Oceania, in which we have followed the reports of Domeny de Rienzi

The Inhabitants of the Caroline or New Philippine Islands.

The natives of the Carolines have a brown, sometimes rather copper-red color. The skin is greasy and soft, as it is sedulously anointed with cocoa oil; the hair is frizzly and curled, but not woolly like that of negroes. Some of the men destroy the beard. They are strong, handsome, and neatly and well built. Their teeth, however, are disfigured by chewing betel. They dress in mats woven of cocoa and plantain fibres, worn as aprons, and sometimes throw over the shoulder a kind of cloak. Tattooing is universal; the chiefs being more strongly marked than other people.

The bridge of the nose is bored through, and frequently ornamented with fragrant flowers. Ear-rings, necklaces, and armlets, made of the tortoise and other shells, usually constitute their ornaments. Upon certain festive occasions, they sometimes paint themselves with ochre and turmeric. Their food consists of cocoa nuts, bread fruit, arum, oranges, sugar cane, and roots; they partake of but little flesh, and out of the sap of the cocoa palm make a kind of palm wine and syrup, cutting off the blossom stem as soon as it appears, and collecting the sap, which is copiously discharged, by means of bamboo canes. Their houses consist of square, roomy buildings, with four and more divisions. The foundation is of stone. Their household utensils are very inartificial, but already indicative of some acquaintance with Europeans and acquired necessities. In general, the inhabitants of these islands are esteemed good, amiable people of nature, entirely uneducated and inoffensive. Kadu, who travelled with Kotzebue, describes them as humane, grateful, affectionate, hospitable, and averse to war. Their women are not treated slavishly, but with respect, and as companions of their husbands. (*Pl. 40, fig. 4*, and *pl. 41, fig. 3*, men and women of the Caroline Islands.) They are said to be very fond of dancing (*pl. 38, fig. 6*; *pl. 41, fig. 4*), singing, and amusing games. In the Caroline Islands the people believe only in invisible heavenly gods, and idols are nowhere observed. In the eastern archipelago neither priests nor temples occur, nor do solemn sacrifices take place; on the western islands, on the contrary, temples are built, sacrifices offered, and religious worship exists. The chiefs appear to be subordinate to each other, according to a kind of feudal system; opinion elevates them high above the lower classes, and they receive extraordinary respect from the latter. On all these islands a curious custom prevails among the men, for two individuals to form an inviolable bond of friendship, which is faithfully adhered to by the contracting parties.

The Hawaiians and Sandwich Islanders in general.

In comparison with the preceding, the Hawaiians and Sandwich Islanders are selfish, ungraceful, uncleanly, and less hospitable, but much more powerful as a nation; and hence display more self-confidence and greater cheerfulness. The chiefs, especially, are of the handsomest and strongest bodily form. The females are pretty, but without attraction. The Hawaiians are but little tattooed, and that without regard to regularity. Men shave the beard and cut the hair in the form of a helmet, the crest of which is frequently tinged fair or whitish. Women wear the hair cut short, only around the forehead a border of longer, bristle-like, erect hair, burnt white with unslaked lime; and sometimes, in the middle of the forehead, a fine long lock, which is tinged violet and combed backwards. In general, the Hawaiians have remained true to their national dress, as well as their ancient mode of life. Only in honor of European travellers do the chiefs appear in fine English clothes. They put them on in the neatest way, and imitate with good grace the manners of civilized people. For the rest, they

go clothed in the fashion peculiar to their country ; and their foreign guest alone is served on porcelain and silver. Fashion prevails also at Hawaiï, with changeable caprice, especially among the women. All now carry mirrors and tobacco-pipe bowls, and an European handkerchief around the neck. The ornaments worn by the queens and persons of rank are of considerable value. Poetry, music, and dancing have also become common. Their dance is not without grace, and is even described by travellers as truly beautiful. (*Pl.* 41, *figs.* 5, 6, Hawaiïans and their dancing.)

The Sandwich Islanders, in general, belong to the Malay race ; are not large, but of agreeable physiognomy, the nostrils, however, being somewhat wide ; the hair, which does not curl, is black, and worn short ; the complexion is blackish brown, and tattooing not frequent. A piece of stuff, manufactured of the fibres of the paper mulberry tree, is their only dress. Upon festive occasions, a bast cloak ornamented with feathers and painting, as well as a feather cap, frequently in the shape of a helmet, is added. Females wear a kind of chemise. Besides the article just mentioned, they adorn themselves with strings of shells, bones, teeth, and feathers, necklaces, &c. European clothing, however, is now also worn by many individuals. The dwellings are round, formed of wicker-work of cane and leaves, and have pointed roofs. The huts stand together in streets ; those near the sea are provided with mason-work for protection against the waves. But few household utensils are seen. Many houses are now built according to the European style, and all people of consequence have stone edifices. A change has taken place also with respect to food, and dishes are prepared according to the European mode. In former times the Sandwich Islanders were described as a very amiable people, advantageously distinguished for hospitality, gentleness, kindness, love of the members of families for each other, and a certain gravity. European manners, however, have thrown many of these virtues into the background. But notwithstanding this, they are still found in a greater measure than on other islands of Oceania, together with industry, activity, and skill in the arts, and superior agriculture. The Sandwich Islanders understand the art of fishing very well, manufacture cloths that evince ingenuity, and their articles of ornament made of feathers are true works of art. Their boats are very strong, and built with much skill ; the builders being as familiar with the water as with the firm land, possessing great dexterity in the management of their boats, even in the roughest weather, and evincing also a high degree of courage on board of ships. Their former weapons, spears, slings, bows and arrows, have been changed in part for firearms ; and European crafts have already been brought to a flourishing condition among them. They amuse themselves by dancing and various games. Until recently they were heathens, and every district, each chief, had particular gods and idols ; their priests possessed great power, acting at the same time as physicians and sorcerers. The sacred places where their idols were erected, and to which the offerings—sometimes human sacrifices—were brought, were called *Morais*.

The Sandwich Islanders are governed by kings unlimited in power ; and

when Cook discovered the islands, Terneoboo or Teriopu ruled over Hawaiï. After his death, which soon followed, Tamehameha, his nephew, succeeded to the government, who conquered the neighboring islands, obtained an European ship from the English, accepted the protection of the King of Great Britain, persuaded many Europeans to settle upon the island, and endeavored to extend European civilization as much as possible. Christianity, nevertheless, was not yet embraced by him, probably because he feared to lose by this step something of the absoluteness of his power; for the practice especially of offering human sacrifice, by means of which he could easily rid himself of troublesome individuals, combined with terror and superstition, enabled him to govern without any restraint. His son and successor, Rio Rio, was the first to order the destruction of all the Morais, and to proclaim the doctrine of the foreigners, at that time not exactly understood by him, as the religion of the state; and in 1820 the principal inhabitants of the Sandwich Islands were converted to Christianity by North American missionaries. Kotzebue, in the account of his last travels, gives, to be sure, a mournful picture of the Christian religion in these islands. He pronounces it, like that found upon the Society Islands, to be mere fanaticism and hypocrisy, forced upon the people by the king and missionaries, and combined with superstitions and everything but pure conceptions of Christianity; and compares these pitiful results with the horrors of the cruel war carried on with the view of introducing Christianity. According to later accounts, however, the state of the Christian religion among the aborigines is said to be much improved. Commerce flourishes in a high degree in this part of the world.

The funeral of a deceased chieftain used to be attended by many ceremonies (*pl.* 38, *figs.* 1 and 2). The corpse, after having been exposed for some time on a scaffold amidst lamentations and ceremonies, was deposited in a cave, where it remained until the flesh had rotted, when the bones were cleaned, some being preserved in sacred places, others distributed as relics amongst the relatives.

The New Zealanders.

The New Zealanders belong to two stocks, a dusky and a light-colored; but have gradually become so intermixed, that many transitions from the one to the other occur. The darker race are probably the descendants of the aborigines; the lighter, on the contrary, the offspring of former conquerors. The first named are shorter, stouter, and broader-shouldered than the latter, whose height frequently exceeds 5 feet 9 inches. The former somewhat resemble mulattoes in complexion; the latter, however, are only rather darker than the inhabitants of the southernmost parts of Europe. The style of their features greatly resembles that of Jewish faces. The hair is sometimes smooth, long, and chestnut-brown; in other cases, dark and curled. (*Pl.* 40, *figs.* 5, 6.)

The first and most conspicuous quality in the disposition of the New

Zealanders is their inordinate passion for war, although many are not insensible to the unfortunate effects of their dissensions. Beyond all doubt, many of the New Zealand wars have their origin merely in the ambition and covetousness of individuals. Some asserted to Englishmen that their fathers and ancestors had always been engaged in warfare, which fact they appeared to consider a sufficient reason why it should never be otherwise among them or their descendants. The wars of these savages are kept up through their fondness for conflict and carnage, and by reason of the spirit of revenge, which among them appears to be more insatiable than with any other nation of the earth. The law of retaliation, in the most rigorous and literal sense, is their only rule for the accommodation of differences; and so long as satisfaction is not rendered to the claims of this inexorable principle, both parties can consider each other only as enemies. If old offences give no pretext to the New Zealanders for their insane and destructive quarrels, their pride, their irritability, and quick sensibility are skilled, in an extraordinary degree, in discovering in a moment reasons for taking offence. The most trifling neglect, or anything that they consider an affront or a want of respect, puts them into a violent rage, and furnishes apparent cause for long continued strife. Although the courage of the New Zealanders is great, and they display an extraordinary indifference to danger and death, yet they are imbued with a spirit of boasting, by which their character suffers almost as much as by their ferocity and cruelty. With the New Zealand warrior, hatred or contempt for his enemy is expressed in every word, tone, and gesture. He challenges him to the combat with every distortion of the limbs and posture of the person which he can call to mind as most expressive of scorn and insult; and after having vanquished and slain him, vents his remaining fury and disdain on his dead body, and even the suspicion of eating the flesh of his enemies is founded on strong probability; indeed facts narrated by former travellers reduce it to certainty.

Their ideas of theft are very loose, if it is not committed upon their friends, but only upon those who have no claim on their hospitality or indulgence. Their covetousness and greediness are extraordinarily great, and they are fond of ornaments and finery. The New Zealand chieftain adorns his head with feathers, and without doubt is proud of this splendid distinction. His cloak of state is carefully embroidered, and both sexes frequently wear pretty carved combs in the hair, and masses of ornaments suspended from their ears and neck. All display the vanity of children when they are more magnificently dressed than usual.

Unacquainted as are the New Zealanders with everything deserving the name of science, and insignificant as are the advances made by them in the arts, yet their intellectual faculties are evidently of a high order. Those who have come in contact with European civilization have, in general, exhibited extraordinary quickness and tact in comprehending its spirit, and in adjusting themselves to the new opinions and customs with which they have been made acquainted; and all the facts reported concerning them prove sagacity, reflection, and other capacities of the mind, which betray a

high intellectual organization. In the few arts known amongst them,—for example, in spinning mats of the flax lily, in cutting tools, weapons, vessels, &c., often ornamented in the most ingenious manner,—they display uncommon dexterity and skill, and even a degree of taste and elegance. Their music is said to be more complete than that of many other South Sea Islanders; they even have national poems, constantly increasing in number, as new occurrences rouse up the imagination of their bards; and eloquence in the assembly is a quality as indispensable to their chiefs and warriors, as valor in the field. All classes of people are fond of conversation; especially of talking of what relates to their chief and his family, or of matters lying beyond the very narrow circle of their own experience or tradition. They are, however, not inclined to believe all things, and often cross-question for a long time, until they are satisfied with the explanation given. Many are well acquainted with the geography of their country; and notwithstanding the want of roads, travel over the island in all directions. Next to singing, dancing (*pl.* 40, *fig.* 7) affords them the greatest pleasure. The martial dance is hideous, and accompanied by horrid pantomimic motions and twistings of the limbs, clashing of weapons, huzzas, and screaming.

Many of their truly disagreeable faults, as their restlessness, fierceness, and sanguinary disposition; their slyness, jealousy, and dissimulation; their suspicion, and lying, and slandering, indicate not so much a want of understanding, as of moral principle. They are the fruit of intellectual powers allowed to grow wild and without their natural and requisite nourishment, as is not unfrequently found to be the case with intelligent children, in whose education little judgment has been manifested. The English missionaries have established several schools; not, however, without meeting many obstacles in the outset. Yet, with all their savageness, most of the children made very rapid advances in learning to read their mother tongue in the primer prepared for their use. When their attention was once fixed, their quickness of comprehension was found equal to that of English children. After a while they were taught writing also.

All that has hitherto been done for the civilization of New Zealand is the work of the last thirty years, and the honor is due to certain religious associations in England, particularly to the *Church Missionary Society*, who have several settlements, with three clergymen of the Church of England, and five schools at three different stations, frequented by almost two hundred children, and some adults. At all the settlements the houses are built in the English style. English agricultural and horticultural systems have even been introduced upon the estates of various chieftains. The lay members employed by the society not only render assistance in instructing, but carry on various trades in the new country.

Upon the whole, the civilization of this nation has commenced in a very promising manner. Their mode of greeting each other is that of many other islands of Oceania; namely, by touching the tips of their noses (*pl.* 41, *fig.* 1). The houses of the New Zealanders are less ingenious than might be expected. They are small and low huts, of seven or eight feet in

length, five or six in breadth, and four or five in height. Those of the chiefs are from fifteen to eighteen feet long, eight to twenty broad, and six high, but like the others have an entrance only two feet broad and three in height, which is closed by a board or a thick mat. The window is two feet square, near the door but somewhat higher, and has a grating of canes. On the side where the entrance is, the roof projects three or four feet. The dwelling-houses of the chiefs are ornamented with carved work. Smoke makes its exit through the door and windows. Household utensils are simple and not numerous. The largest buildings are the public storehouses. The huts of the natives are scattered over the country ; each horde, however, possesses a fortified village, built upon steep rocks and other inaccessible spots, which is large enough to receive all the members in time of war. Formerly, before firearms became common amongst the New Zealanders, these villages could be defended for months.

Two square, thickly woven mats constitute the dress of both sexes ; the one worn as a kind of coat, and the other as a cloak. At present they endeavor to adorn their persons with European clothing. They anoint themselves with train oil, and smear the face—and in time of war the whole body—with ochre. The faces and persons of the chiefs are frequently so much tattooed, that scarcely any part of the original color remains visible. The innumerable lines frequently form, however, the most beautiful and ingenious figures (*pl. 41, fig. 2*, operation of tattooing performed by women). Great care is bestowed upon the construction of their pirogues ; their fishing nets are extraordinarily large.

Deceased persons, especially of the higher classes, receive great honors. In the first place, the corpse is watched for three days, since the New Zealanders believe that the soul does not fully separate from its mortal integument in less than that time. The deceased is clothed in his handsomest garments, rubbed with oil, and ornamented and attired as in his lifetime. Relations and friends show their grief by tears and loud lamentations, and by means of bloody lacerations of the face and shoulders. Instead of extending the body, as is done in Europe and America, the limbs are bent towards the belly, and packed together. The corpse is then borne to a solitary spot, there buried, and the grave surrounded with palisades. Posts, crosses, or carved figures, colored with ochre, mark the final resting-place of a chief ; that of a common man is designated only by a heap of stones. A grave is called *udupa* (abode of glory). Provisions are deposited upon the sepulchre. According to the opinion of the New Zealanders, the soul of the deceased, although immaterial, still partakes of food. (*Pl. 38, fig. 3*, funeral of a prince.)

The Inhabitants of the Society Islands.

The Society Islands, the largest of which is the island of O'Taiti, or Otahiti, like the Friendly Islands, possess a climate which, although under the perpendicular beams of the sun, is nevertheless softened by the sur-

rounding ocean, and upon the high mountains is even temperate. Hence, tropic plants, as well as those of temperate climates, thrive in the most luxuriant abundance on these paradisiacal islands. For this reason, the inhabitants obtained with easy labor their trifling necessities of life, and lived in prosperity and happiness until the Europeans obtruded upon them by force a new belief, and robbed them of the enjoyment of life. Since 1815, Pomare II., Queen of Otahiti, with the assistance of the missionaries, has drawn up a code of laws, which has gradually increased through additions. Since 1825, there has existed a kind of assembly of representatives, to which the different districts of the island send delegates chosen by the people. By this means, the missionaries, it is true, have secured liberty and property to the mass of the population, but nevertheless have introduced many regulations that militate too greatly against the national character to lead to a good result.

The baubles formerly tendered by sailors to the natives for the productions of their country no longer satisfy them; articles of clothing and money are now demanded, and even the latter is not taken in full when not quite bright and handsome. They are very avaricious, and yet reproach with avarice every person who will not give them enough. Men of rank are arrayed in a motley mixture of European and domestic dress. The latter resembles, upon the whole, that seen in the Friendly Islands. With trifling exceptions, the dwelling-houses are still as they were at the time of Cook; bearing some resemblance to what we call sheds, and having a thatched roof supported by posts and bamboo poles standing close alongside of each other. The floor is always strewn with hay, which soon becomes disgusting from dirt and moisture, and is only renewed when the evaporation becomes too intolerable. A chest of drawers or a bedstead is sometimes found in a corner of the apartment; but little use is generally made of household furniture, and these people prefer sleeping upon mats spread out upon straw. In general, they pursue only such employments as are absolutely necessary to the support of life, or with which they can satisfy their vanity. In their huts they lie stretched lazily out, playing upon the jew's-harp, braiding straw hats, or making ear-rings or finger-rings of small glass beads.

Dancing was formerly one of the amusements most enjoyed by them, and the attire of the female dancers was peculiar and fantastic. A wide petticoat surrounded the lower part of the body, and a piece of stuff bound below the breast, around the waist, formed upon the back two large plaited wings. At present the law forbids dancing. Belcher, one of the latest visitors to these islands, had, however, the opportunity of seeing a dance of this description in the house of the regent. He says with regard to it:

"She (the regent) commanded that a dance be performed for our amusement. This gratification we had scarcely dared to expect, as such representations are prohibited by law under a heavy penalty, as well to performers as spectators, and for the same reason it was necessary that everything should be arranged quietly, and the sounds of the *vivo* or bamboo flute muffled, so that they might not peradventure reach the ears of an

Aava (police officer), who, in a soldier's jacket and armed with a rusty sword, marched up and down on the seashore. Even this little melodious instrument, which affords so much pleasure to the natives, with whose nature dancing and music are intimately interwoven, is now strictly prohibited. Before the enactment of the law which abolished dancing none of us had witnessed such a performance; but in that to which we were treated, not the slightest thing occurred calculated to give offence to an unprejudiced person; and I was hence confirmed in the opinion that Pomare, or whoever it was that made the laws, would have attained his object more effectually by not prohibiting these amusements entirely, but by imposing suitable restrictions. To some of us who had read the captivating description of the Otahitian dance given by Webb, the companion of Cook, the reality seemed so flat that we preferred listening to the simple, well performed songs of the girls attending the queen, which skilful improvisatrices always adapted the words of their song to the occasion." (*Pl. 38, fig. 4, Tahitian girl carrying presents; fig. 5, Tahitian dance.*)

The Inhabitants of the Amboynas.

The inhabitants of the Amboynas are mostly of Malayan origin. The men go almost naked; an apron around their loins, and a palmleaf hat, fancifully painted, or a colored turban, constitute their entire dress. Spear, shield, and sword are their usual weapons; ear-rings, necklaces of coral or shells, and bracelets, serve for finery. At times also the dress consists of a species of shirt with or without sleeves. The hilt of the broad, somewhat bent, and rather short sword, is not unfrequently ornamented with the hair of a slain enemy; and the shield is square, made of wicker-work, and often overlaid with shells and plates of metal. The women are not so much exposed to the sun, bathe several times a day, and anoint the skin in order to make it soft and delicate; and have in consequence a lighter complexion than the men. They wear a chemise open in front; their hair is cut short at the forehead and the back hair bound up on the crown. (*Pl. 40, fig. 1, martial dance of the inhabitants of the Island of Booru or Booro, one of the Amboynas.*)

The Inhabitants of the Philippines.

Besides Spaniards and Chinese, &c., the population of these islands is made up of Malays and Papuans. The Malay stock are distinguished above that of other islands for a diminutive stature, especially in the female sex. Before the Spaniards made their appearance upon these islands there prevailed among the tribes a blind heathenism, intermingled with some Mohammedan views propagated by Arabs. The dress of the majority consisted barely of a piece of matting or stuff tied round the hips. Even at that time a brisk trade by barter was carried on, customary also at the

present day. By the Chinese they had been taught a knowledge of weights and measures, and a current coin called *patty* was found amongst them. On the whole the Philippine Malays are esteemed good-natured, kind, and sociable; the cruel treatment, however, and bad example of their oppressors have made most of them malignant, indolent, hypocritical, and covetous. The Spanish government forced upon them by revolting tyranny the Roman Catholic faith, but only succeeded in making seeming Christians of the people. They are excessively fond of games of chance; cockfighting and combats with paper kites are among their favorite recreations. Neither pains nor expense are spared in breeding gamecocks, in manufacturing and decorating large paper kites, and training themselves in their management, in order to be able to give a public cockfight or kite battle. Young and old assemble to witness both these amusements, and considerable wagers are staked upon such occasions (*pl. 40, fig. 2, a cockfight*). As a general thing, cockfights have been common amongst the Polynesians since the earliest times. The cocks enter upon the conflict without any other weapons than those furnished by nature. No particular color is preferred, but compact wings, necks properly furnished with feathers, and long tails are considered essential points in the birds. Fights for wagers occur sometimes between individual owners of gamecocks; at others, entire sections of the island take sides. A particular god presides over these fights, *Ruai-fatua* (the god of gamecocks), one of the inferior deities. To the recreations customary amongst the Polynesians belong wrestling, boxing, and swimming matches. Races for wagers on foot and in canoes occur, and military games are performed, among which the *Vero-patia* (hurling the javelin) is most worthy of notice. Ball-playing is also practised, in which the ball is struck with short sticks; football also is one of their amusements. Another game of ball is customary, however, only among women. A place is chosen upon the beach, the ball thrown aloft, and both parties endeavor to get possession of it. Very frequently it is driven into the sea, and then some twenty women are seen to plunge into the waves, and continue the struggle whilst swimming. Numerous and varied are the dances of the Polynesians. At times both sexes take part in them, sometimes only one. Flutes, drums, and sometimes singing, form the accompaniment. Most of these dances represent a kind of pantomime, in which the arms and feet are moved. The prettiest of these dances, called *nura*, is usually performed by daughters of chiefs, five or six in number. The most important families of the neighborhood are invited to be present, and the dancers recommended to the attention of the young chiefs, in the hope that the latter, transported by their charms, may demand the young ladies in marriage. The pauses between the dances are filled up by clowns, who by means of their grimaces and capers must draw laughter from the spectators.

The aboriginal negroes of the Philippines are now called *Aëtas*, and the Papuans, who came across from the island of Codemantan, are denominated *Igolotes* or *Negritos*. Upon many large islands, like Buglas and Panay, they are readily distinguishable. The former are soot-colored, the hair

somewhat frizzled ; the others are blacker, have more agreeable forms, and waving locks. The islanders mastered these blacks with great difficulty, and drove them away from the level country. Those found by the Spaniards on Luçon had made some advances in civilization. They were under a government composed of chiefs, assisted by aged persons, who were to guard the laws. The Aëtas still go naked, only tying a piece of stuff around the hips. Their occupations are hunting, fishing, and searching for wild fruits. Bows and arrows are their only weapons, and are handled with dexterity. Among the children, some are met with who in spite of their black parents are almost entirely white ; they are known in Manilla by the name of *sons of the sun*. A few missions are still kept up by the Manilla government for the conversion of the Aëtas, but as the priests know that at the first opportunity the converts withdraw from the clerical authority, they baptize only children, who are bought by the Spaniards or Mestizos at an age when the mode of life practised by their fathers has not yet been engrafted upon them. The soil held by the mountaineers is so productive in fruits that they resign themselves to great indolence. In former times they were pleased to restrain the Spaniards in cutting wood upon their mountains and make them pay a tribute in tobacco. At present, being less numerous and having become intimidated, they allow their enemies to extend themselves wherever they like, and before long will have entirely disappeared from their native country, if they do not embrace the civilization which is confining them on all sides.

The Inhabitants of the Marian Islands.

The missionaries describe the inhabitants of the Marian Islands as a handsome, vigorous race, whose principal traits are childlike simplicity, affection, and mildness. Here likewise, immediately after their occupancy of the islands, the Spaniards introduced the laws of their native country and Christianity ; but according to what may be inferred from the accounts of travellers, the inhabitants appear to have been by far a more civilized people than the Spaniards themselves. They are also physically active, and swim and dive admirably. The men are dusky brown, tall, muscular, with strong limbs, expressive face, the latter, however, not without a trait of wildness. Formerly they went naked, without tattooing or painting ; the women alone wore short aprons around the hips, an ornament of small shells around the neck and arms, a decoration of tortoise-shell on the forehead, and similar ones attached to the girdle. Their dwellings were built of palm trunks, thatched with leaves of the same tree, and lined on the inside with bast mats. Their food consisted of cocoanuts, bread-fruit, yams, and rice, and the flesh of birds and fish. A spirituous drink was also made by them (*pl.* 40, *fig.* 3), but they were temperate in their habits. Women were treated with a respect otherwise only to be found amongst the most civilized nations. It is said that in consequence of this treatment they really were beautiful and delicately formed, evincing cheerfulness, good-nature, and

friendly, agreeable manners. They rendered the ballads of their poets in sweet songs and expressive pantomimic dances, thereby giving general pleasure. The management of the household was in their hands exclusively. Without any law against polygamy every man contented himself with a single wife, who not unfrequently revenged infidelity committed by the husband. A neglected or ill-treated wife had the right to return home to her family, and to take with her the entire household furniture. Even when his better half proved false, the husband, although permitted to wreak his vengeance upon or even slay the seducer, was obliged to treat the erring fair one with forbearance. In case a man divorced his wife she remained in possession of the property and children. The Malay feudal system prevailed among the natives of the Marian Islands. The *chamorris* or high nobility, the middle class, and the common people constituted the population. These classes did not intermingle by marriage; a higher caste never even eat with a lower. Their religion was very simple, yet so far developed as to employ priests. A highest being elevated over all things and creator of the universe, with many intermediate spirits standing between him and mankind, was acknowledged and revered. It is probable also that they worshipped the stars, as they everywhere individualized nature, and held that the mountains and valleys, rivers and trees, were peopled by spirits. The fundamental idea of a good and bad being was also found amongst them. The priests were at the same time the sages, physicians, and bards of the nation. Their funerals were very solemn festivals, the dead were buried in the ground, and their tombs ingeniously ornamented. The widely extended custom of having the deceased deplored by mourning females was also found here. To Father Gobien we owe the preservation of some of these lamentations. One of them runs thus: "My life is without value, my future a lingering death; grief envelops my eyes, weariness clouds my being. My star is extinct, the light of my moon, the sun of my enjoyment, darkened for ever; deep night, the whirlpool of misery, the ocean of despair flows around me." As a refrain, another mourning woman replies: "I too have lost all things; the comfort of my days is no more. Stop, my heart, for thou beatest no more in his presence! Behold, the image of our hero, the honor of our house is torpid! His arm no longer defends our people. As he is no more, what shall we do here? Of what value is life to us without him?" These lamentations uttered in a singing tone, with strong modulation, were closed with long drawn out howlings. A truly sorrowful impression is made by the lamentations of this nation foreseeing their destruction at the end of the seventeenth century. "These strangers promised to make us happy; alas! they have robbed us of liberty. They have confined us in clothes that paralyse the use of our arms; they have brought us diseases and detestable vermin and noxious animals. Unknown troubles have they poured out over us, the hungry guests. We led an innocent life, full of work and pleasure; were healthy and happy. But they brought new necessities and new troubles; we no longer freely and happily enjoy life; our loss is irreparable." Their complaints, however, were too late, too late the war against the oppressors;

they succumbed to European weapons, and in 1817 Kotzebue met with only a solitary couple of the old original stock. At present Spaniards and mestizos, mulattoes, Philippine and Sandwich Islanders, Carolinians, &c., inhabit the Marian Islands. All the inhabitants profess the Christian religion, and wear a cross around the neck, and in every village a stone cross is erected.

The Inhabitants of the Friendly Islands.

They are in general of handsome, regular growth, large, vigorous, and fleshy, without being so stout as the inhabitants of the Society Islands. Corpulency is rare; a few of the chiefs only being inclined to it. Physiognomy varies as it does amongst the Caucasian race, and if we can trust some of the representations, may even be called handsome. Many have smooth hair, not very thick lips, and some an arched nose. The eyes are rather small, and oblique; the complexion, particularly of persons of distinction, is not very dark—about like that of the inhabitants of the southernmost parts of Europe. Women of rank frequently have a handsome figure, and an almost entirely white complexion. In general, the *Tongans* (inhabitants of *Tonga-Taboo*) enjoy good health, but are sometimes troubled with a kind of leprosy. In their intercourse with Europeans, they show themselves in the beginning very friendly and amiable; after some acquaintance, however, they evince directly opposite qualities. They are covetous, daring, and masters of the art of dissimulation; but, on the other hand, hospitable, courteous, and magnanimous; very brave and decided in character, without being at the same time addicted to boasting. In mental capacity, there appears to be a great similarity between them and the New Zealanders. In their households they are very mild and amiable, and greatly devoted to their superiors, strangers, and relations.

The dwellings are neatly and very durably constructed, mostly oval, and about 30 feet long, 20 feet broad, and 12 to 15 feet high, if they belong to men of rank; the huts of the lower classes are much smaller. They consist of a scaffold of props and beams, which are very dexterously joined, and nailed together with cocoa pegs. At the two sides, the roof reaches to within four feet of the ground; at both ends, however, it touches the floor. People of rank thatch it with sugar-cane leaves; poor persons use cocoa mats. Their utensils are simple, and exhibit no great variety. A number of houses are usually grouped into small villages, several of which are fortified. Their food consists of bananas, bread-fruit, cocoa-nuts, fish, shell-fish, &c.; pork, poultry, and turtle, appear upon the tables of the rich. Common people, among other things, eat rats. The dress of both sexes consists of a piece of stuff wrapped around the hips, and fastened with a girdle. Poor persons frequently possess nothing but an apron. For a head-dress a cap, or a kind of turban, or a feather crown is worn. Some wear long pendent hair; others cut it short all over, or only on certain parts of the head; it is rubbed with pomatum and all kinds of greasy substances, and a red, white, or fair color

is given to it by means of quick-lime or other things. They bathe very often, and as persons of rank anoint the whole body with perfumed cocoa-oil, their skin attains an extraordinary softness and great beauty. Upon festive occasions, the hair is so immoderately rubbed with oil that the grease is continually trickling down, and, on account of the strong odor, is very unpleasant to those unaccustomed to it. The Society Islanders are fond of adorning themselves with necklaces of red pandanus berries, or with fragrant flowers, small shells or pieces of mother of pearl, bird-bones, &c. They also wear bracelets, and are passionately fond of glass beads. Tillage, the building of their houses and pirogues, manufacturing their articles of clothing, necklaces, and bracelets, tattooing, &c., constitute their employments. Singing and dancing, as well as many kinds of games, are their amusements. Their musical instruments consist of a kind of flute, and a species of drum. (*Pl. 39, fig. 1*, chief of the Tongans; *fig. 2*, fight between two women; and *figs. 3, 4, 5*, sports of girls among the same.) The Tongans worship a multitude of gods, bearing the common name *Hatua*. Juggling and astrology greatly prevail amongst them.

The Inhabitants of the Navigators' Islands.

The inhabitants of the Navigators' Islands are described differently; but they are all cannibals, and a curved line drawn from the south end of New Zealand, around the Feejee, Navigators', and Tonga islands, will perhaps inclose the region where the practice of eating the flesh of human beings is most general.

The inhabitants of this section are, however, by no means in the lowest grade of civilization. They belong to the handsomest of the East Oceanians, are frequently six feet six inches in height, and built in a herculean manner. The women are somewhat smaller. In many arts they have made great advances, and are superior to all as sailors, being scarcely ever away from the water. (*Pl. 42, fig. 1*, dance in Samoa, one of the Navigators' Islands.)

The Australians, or New Hollanders.

The inhabitants of New Holland are a small and ugly people; distinguished—and not very advantageously, as we have already remarked—for very long spare legs and arms, forming a contrast with the large feet and hands. The knee is thick, and the calf thin; but this is chiefly the case with those who live in the forests, and have but little food. This they are obliged to bring down from the trees, which they are very skilful in climbing. The exterior of the men is harsh and repulsive; the nose very broad below; the mouth large; the beard goat-like; the hair bristly; the eyes are black, deep-set; the eye-brows thick; the lips large, and turned out; the teeth, however, well arranged; the jaws frequently projecting very far. Upon the whole, the countenance is spiritless. Many have a suffering, but

at the same time a malignant look. The complexion differs greatly in the various tribes, being deep black, blackish-brown, or yellowish-brown, according as they are more or less distant from the equator. Both sexes rub their skin with fish oil, which gives it a bad smell, but protects them from the bites of mosquitoes. They have the strangest taste with regard to ornaments. Some decorate the hair with fish and bird bones, kangaroos' and sharks' teeth, feathers, small bits of wood, and dogs' tails, attaching these odd trinkets with gum ; or cover their heads with moss. To the south of Botany Bay, the hair is braided in the shape of small bits of rope. In fitting out for war, they smear themselves with red resin ; when going to dance, however, they bedaub their persons with shell-lime. Around their eyes they paint a wide circle, and undulating lines around the arms, legs, and feet. Amongst both sexes scars are esteemed the greatest ornaments ; and the flesh of their wounds, therefore, is often torn open, and kept in this condition until it swells out, the sores not being allowed to close before then. This singular embellishment is applied even to children. Among women, two joints of the little finger of the left hand are wanting, the upper joint of the little finger of small children of the female sex being bound under with a strong hair, thus checking the circulation of the blood, and causing the two front joints to rot off. It is generally believed that the New Hollanders perform this operation because the joints just mentioned hinder the women in holding the angling rod. The men, at least those dwelling in the vicinity of known coasts, have a front tooth knocked out, which is delivered to the predominant tribe as a token of subjection (*pl. 39, fig. 10*). This is called the ceremony of the *gna-lung*, by which the youth enters upon the rights of manhood, and is henceforth bound to practise assiduously the use of arms, and to harden himself in the endurance of pain.

The weapons of the New Hollanders consist of lances, shields, battle-axes, and clubs. The lances are hurled with great dexterity, by means of a staff three feet long, the proper office of which, no doubt, is to direct the course of the lance. The shield is made of bark of trees, or solid wood hardened over the fire. The stone battle-axe is their most destructive weapon. The carved work on the weapons is not the same in all the divisions of a tribe, and by it they are recognised. Angling-rods and nets, and the dances, differ also in the several hordes. As it is a difficult matter for these people to kindle a fire, it is almost always carried with them. In case they have none, however, the process by which they obtain it is as follows : they take a small board or flat piece of soft wood, in which they make a groove ; in this they insert the point of a short stick of very hard wood, and move it to and fro with great rapidity and pressing the point as much as possible, until the continued friction ignites the softer wood. As this is a very fatiguing operation, it is seldom accomplished by a single man, but several draw near together, and as soon as one gets tired another continues the task, until the object is attained. The dwellings are very simple. The people living in the forests construct theirs simply by placing pieces of bark together, and cover the ground with sea grass. The household utensils consist of a few baskets made of bark, or hollowed pieces

of wood. The residents of the sea coasts have larger huts than the inhabitants of the forests. Many also live in clefts in the rocks, or grottoes. Being very sound sleepers, they endeavor to obtain dogs from European settlers, in order to use these animals as guards. Some of the natives having intercourse with the English cover themselves with rags, or with a piece of cloth, in order that they may not be in a state of entire nudity; the rest go naked, girls only wearing aprons.

The New Hollanders appear not to have any object of religious worship, not even the fire, but nevertheless seem to have a conception of a life after death. The inhabitants of the coast, of whom we know most, live on fish. Their fragile boats are made of the bark of trees. The foresters manufacture a kind of dough of roots and bruised ants, to which the eggs of this insect are then sometimes added. Worms, caterpillars, and everything else coming in their way, are eaten, as nothing nauseates them.

Their disposition presents the most glaring contrasts; cruelty and magnanimity, generosity and selfishness, forgiveness and revenge, courage and sluggishness, candor and cunning, confidence and jealousy. Revenge for blood is rigidly carried out, and their women are treated barbarously. Pain is endured with the greatest patience and firmness. Age is highly honored, and the highest respect shown to blind old people. No one is allowed to place himself before an individual of this description, and even in a boat the rower is obliged to sit behind the blind old man. Towards armed persons they are submissive; the unarmed, however, are very likely to be attacked by them. They are very skilful imitators.

When a child is from four to six weeks old, they give to it, without any ceremony, a name borrowed from some object that they have daily before their eyes. From childhood they are taught to hurl the lance and to evade the throw. In the twelfth or fifteenth year the bridge of the nose is pierced, in order to admit a bone or a piece of rush as an ornament. In most cases, the husband selects his companion for life from another and indeed hostile tribe, and carries her off by force in the absence of her protectors (*pl.* 39, *fig.* 7), who in their turn retaliate upon his tribe as soon as opportunity offers. The woman obtained in this way, in spite of all cruel treatment, soon becomes reconciled to her lot. (The peculiar dance of the New Hollanders is represented in *pl.* 39, *figs.* 6 and 9.)

The oldest of the family are the heads, and are called *Biannai*, that is to say, father. When the New Hollander dies, his skin is stripped off, dried, packed up, and preserved, whilst the body is burnt. (*Fig.* 8 represents the procession to the funeral pile.)

MILITARY SCIENCES.

PLATES V. 1—51.

INTRODUCTION.

WAR, that destructive strife of parties, a strife for life and death, has ever been the lot of nations, for even the longest peace has been only a preparation for war. Immeasurable is the evil war has brought upon the world, immeasurable that which it will still bring, and yet we maintain that war must be; war is the spur of nations. Assuredly we would not deny the blessings of peace, we would not dispute that arts, sciences, commerce, and industry flourish only where it prevails; but in peace too the unused strength grows languid; in peace the most corrupting luxury, the most enervating indolence are born and nursed. Only that state, only that people, which in peace provides for war, will be prepared for every contingency; therefore should we study the art of war, therefore should we practise military sciences, and every citizen should be also a soldier. And is not this impulse to warfare based in man's very nature? Is it not manifested even in the sports of thoughtless, unconscious boyhood?

As war, then, occupies so important a place in the circle of human activity, we would in what follows show by general outlines the character and manner of warfare among the earliest nations, and how in process of time this has been brought to the degree of perfection which we now find it displaying.

Sources of accurate information respecting the warfare of ancient nations are not wanting. The poets sang at first the deeds of warriors, and Homer and Virgil are rich in such materials. Historians related the strife of heroes, traits of heroism, and artifices of war; they described the equipments, the war-machines, and the field-equipages. The sculptures also of Thebes, Luxor, and Nineveh, of the Grecian monuments, of Trajan's pillar, &c., the fresco paintings of Pompeii and Herculaneum are, besides the works of a Polybius, of a Vegetius, and others, excellent sources of knowledge.

Much nearer to us are the middle ages; and our armories and arsenals still contain in abundance the weapons and armor of that time. But even the interior arrangements of the middle-age warfare, since the brave George of Frondsberg, have been described for us in a large work by a citizen of Ulm, Leonard Fronsperger.

A. WARFARE OF ANTIQUITY.

If we would survey the warfare of antiquity we can only do so by examining that of the separate nations, for each had its own peculiar system, dependent partly upon the situation of the country, partly upon the political position and the civilization of its people. The warfare of antiquity we consider as extending from the earliest times of which we have any knowledge down to that period when, with the destruction of the Roman Empire, an entire change in the political condition of nations and a totally different mode of carrying on war commenced.

Among the nations of which history gives us the earliest knowledge Egypt stands first, for besides the historical books of the Bible, Herodotus and other authors supply copious accounts of this in so many ways remarkable nation.

THE EGYPTIAN MILITARY SYSTEM. In Egypt the separation between the different ranks was strictly defined, and in whatever caste an individual was born he found there the aim and purpose of his life. Thus, there was a sacerdotal caste, and besides others, a warrior caste also.

During the predominance of the sacerdotal caste, the historians of antiquity assign to the warrior caste the second rank in the state; but when the warriors, no longer permitting themselves to be ruled by a priest-king, chose their ruler from among their own caste, they assumed the foremost rank. Menes was the first king so chosen.

The idea of an army of mercenaries never occurred to the ancient Egyptians; military service was given as a privilege to a certain class in the nation, and they intrusted the defence of their country to men who had something to lose; for the common soldier possessed not less than twelve *ares* (about six acres), which land served for the support of his family in peace, and was free from taxation. In the time of Herodotus the warrior caste was separated into two divisions, the Calasyrians and the Hermotybian. The first numbered about 250,000 men and occupied about $4\frac{1}{2}$ *nomes* in the Delta; while the Hermotybian were but 160,000 strong and dwelt in the *nomes* of Middle Egypt, Chemmis, and Thebes. Strabo makes the war power much more important, indeed almost twice as great; and this is probable, for at the time of Herodotus Egypt already hastened to its downfall. As Egypt was compelled constantly to secure its boundaries against the inroads of foreign nations, a part of the army was always in service; the garrisons of the different military posts relieved each other at stated periods, which were fixed at two years. Such a garrison, 100,000 strong, which was left for three years unrelieved, abandoned its post and established itself as a military colony at the cataracts of the Nile. The medium strength of the armed force of Egypt in time of peace is estimated at 180,000, but the details of their organization we know only from the sculpture-strewn walls of old monuments. In these the different parts of the army can be distinguished with tolerable accuracy.

First come those who fought in chariots, necessarily in smaller proportion than other arms. Each car had two wheels, was open behind, harnessed with two horses, and furnished with javelin, bow and arrows, or battle-axe. At the warrior's right stood the driver. These chariots took among the Egyptians the place of cavalry, since they are said to have had no horsemen. If horsemen are seen on old monuments it is only singly, and usually as unarmed messengers. The remainder of the army consisted of infantry. Of this the heavy armed, which fought in line, carried breast-plate, helmet, shield, spear, or battle-axe and sword; the others, light troops, were bowmen, slingers, and scythe-men. *Pl.* 1 shows a great variety of Egyptian weapons, as they are found partly upon old monuments and partly in catacombs and the pyramids. *Fig.* 1 shows a two-edged straight sword; *fig.* 2, a curved sabre sharpened only on the outer edge; *fig.* 3 is a dagger; and *fig.* 4 a short mace, which in hand to hand combat was a very dangerous weapon. *Fig.* 5 is a shield of rectangular shape; but these are found also with a round piece taken out on the right side, and small ones entirely round for light troops. In order to protect the throat and upper part of the breast those who fought in chariots and the light troops wore a breast-plate (*fig.* 6) either of strong leather or metal; and the former, as well as at times the heavy armed and the bowmen, wore a shirt of woven mail (*fig.* 22). Upon the head were worn helmets of the most various forms, and *figs.* 7, 8, 9, 10, 11, and 12, show several patterns of these, some of which were of leather and some of metal. *Fig.* 9 is an archer's helmet of the oldest form; *fig.* 12 a king's of the time of Herodotus; *figs.* 10 and 11, chiefs' helmets of heavy armed infantry. *Fig.* 14 is a javelin with a hook, and *fig.* 13 shows the case in which such javelins were carried. *Fig.* 15 is a quiver with a cover for such arrows as are represented in *fig.* 16; such a quiver was fastened by a chain or strong thong passing over the shoulder, and lay obliquely across the back, the opening on the right side. *Fig.* 17 is a spear. *Figs.* 18 and 19 battle-axes, such as were carried by the heavy armed in addition to the spear. The bows were very large and strung with sinew. The emblem of the warrior caste was the vulture, and in all representations of battles this bird is always seen near the king.

The troops marched and manœuvred in regular order and movement by legions or companies to the sound of the trumpet or the drum and fife. Instead of standards they carried insignia such as are shown in *figs.* 20 and 21. The king was commander-in-chief, his sons or his bravest men his generals. The king shared personally in all the fatigues of war, and stood in his chariot: armed from head to foot he hurled his darts upon the foe or smote him with the battle-axe. A tamed lion, accoutred for the battle-field, was always beside the king's chariot. The troops were diligently trained in time of peace by various gymnastic exercises, in performing which they went almost naked, and had only a broad leather belt about the body. Thus, too, they often fought in war, as is shown in numberless instances by the sculptures. The dignitaries of the host were called *Æris*; the captain was adorned with an ostrich feather; officers of other grades were

distinguished by different insignia. Every *nome* was commanded by a general.

The castrametation of the Egyptians was simple. A palisade carefully guarded inclosed the camp. The tent of the king or commander was upon the side opposite to the entrance, in its neighborhood smaller tents for the subordinates; the tamed lion, his feet fettered, was with his keeper beside the king's tent. Horses and asses were arranged symmetrically at the entrance of the camp; opposite, the chariots, baggage and equipage wagons for the horses, for the asses pack-saddles with panniers. Upon the right hand side of the camp was arranged the effective force, and here soldiers and recruits were trained and disciplined; upon the left were the hospitals and lazarettoes. The principal exercises were performed outside the camp. On the march the war-chariots went behind and on both sides of the column, the heavy armed infantry protected by their large shields in the centre; at all exposed points the light troops formed an advanced guard.

Upon the naval force and warfare of the Egyptians we shall give details under the head of Naval Sciences.

THE PHœNICIAN MILITARY SYSTEM. Next to the Egyptians in importance at the age of which we are treating stand the Phœnicians. All knowledge of their earliest formation and first undertakings is lost, and for the little we know about them we are indebted to the Bible. The Phœnicians had established themselves on the Syrian coast upon the narrow strip of land extending from Aradus to Tyre. Sidon was the oldest city, and from her Tyre and other colonies were founded.

A consolidated Phœnician kingdom indeed had never any real existence, but only a league of small states which lent each other mutual assistance against external foes. At the head of this confederacy stood Tyre. Carthage and Gades were the heads of other colonies.

Of a standing army with the Phœnicians we know nothing, at least not a native one; but the small population of their cities must always have compelled a resort to mercenaries in war, and accordingly the garrison of Tyre consisted of Persians, Lydians, Lycians, and the contingent of Aradus. The mode of warfare of the Phœnicians we learn from

THE CARTHAGINIAN MILITARY SYSTEM. Carthage, a Phœnician colony, which came frequently in contact with the cultivated nations of the next age, and whose origin and history were therefore studied by them, was at once a land and sea power. Upon her naval strength we shall treat under its proper head.

It lay in the very nature of a state like Carthage that only a small portion of her citizens could become soldiers; these were principally the distinguished and the noble; and for them especially the cavalry were organized. The cavalry were lavish in expense, and were permitted to wear rings, as many indeed as they had made campaigns. Diodorus tells us that in an army of 70,000 men only 2500 were citizens; but on the other hand that in time of need all took arms, and that once the city of Carthage alone furnished 40,000 infantry and 1000 horsemen. The Carthaginians proper

formed a peculiar corps, usually the body-guard of the general, composed of footmen and cavalry.

The great army, however, which Carthage brought into the field, consisted of mercenaries; and nearly half of Africa and Europe sent their hirelings to them. Half naked Gauls stood side by side with white-clad Iberians; savage Ligurians beside well equipped Nasamones and Lotophagi. Carthaginians and Phœnician Africans formed the centre; countless swarms of Numidian horsemen, from all the races of the desert, the wings of this vast host. Balearic slingers were the advanced guard, and elephants with their Ethiopian drivers upon their towers (*pl. 5, fig. 3*) made, as it were, a chain of movable fortresses along its front. This Carthaginian order of battle with elephants is shown in *pl. 13, fig. 6*.

THE MILITARY SYSTEMS OF MEDIA AND PERSIA. If now we turn to Asia, the Medes and Persians will, of all people known to ancient history, most attract our attention. From the Medo-Assyrian kingdom of Arbaces, a Median kingdom proper separated itself, under Deioces, about 700 years before Christ, whose king first established an organized army among the Medians, and then among the subjected Persians, by separating the lance-men, archers, and cavalry into distinct divisions. Yet only under Cyrus did the armament and discipline become effective.

In every province of the empire, spread over the level country, or collected into garrisons, were troops which differed in their organization. As to the first, their number was exactly fixed for each province. The main strength was cavalry, but there were also archers, slingers, and heavy armed infantry. The province was compelled to maintain the force; and with respect to administrative government, they were subject to the *satrap*, but the command was the king's alone, by whom the troops were yearly mustered, and without whose consent no satrap could discharge them. In this manner was the whole land, independently of political divisions, separated into military districts, each with its appropriate muster-place. The division of these troops through the country was into bodies of 1000 men each, whose commander was called a *chiliarch*. Cyrus had in Upper Asia 100,000 men. His general Abrocomas commanded 300,000, and the army upon the Granicus numbered 40,000. Distinguished from these troops were the garrisons of the fortified cities, which had again their own commanders. Those just named were the royal troops; but besides these were the household troops of the nobility, whose number often amounted to many thousands.

Originally the whole Persian army was composed of Persians, but afterwards these withdrew from the service and their place was supplied by hirelings, partly Asiatics, partly Hyrcanians, Parthians, and Sacians; the flower of the army, however, at that time consisted of Greeks. The national army of Persia was organized by dividing the whole population able to bear arms into squads of ten, each having its chief, then came the commander of a hundred, then the chiliarch commanding 1000, and then the commander of 10,000 men; thus it was easy to assemble very rapidly the largest force, as it needed only an order to the *myriarch*, the chief

of 10,000, who communicated it to his subordinates. These same divisions were retained afterwards with the mercenaries. The higher officers stood in great respect, and the generals were always relations of the king. When a great war commenced, then a levy en masse was ordered; all the nations of the empire were assembled and divided as above. Upon the march no order was observed; the king with the Persians was in the centre, the other nations marched as they chose. As little order was maintained in their encampments; for the king and chief officers there were tents; all the rest bivouacked in the open air. Only on approaching the hostile boundary was there a muster and division of the host by nations; and when Xerxes mustered his army in Europe, it was found to contain fifty-six nations. Among them were Sagartians, who, otherwise weaponless, caught their foe in a leathern noose, Libyans with armed chariots (*pl. 5, fig. 4*), and Arabs upon camels.

The arms of this motley host were naturally of equal diversity. A number of the weapons used by Asiatic nations who belonged mostly to the Persian armies are brought together on *pl. 1*. Thus *fig. 23* shows the bow and quiver of the Medes and Persians, whose shield of strong leather with a rim and boss of iron is represented in *fig. 24*. The bow was carried usually in the case belonging to it, shown in *fig. 25*, where a spear also is represented. *Figs. 26* and *27* show Median and Persian helmets and storming-caps. The Parthians had bows as in *fig. 28*, and spears whose momentum was increased by a ball at the butt, as in *fig. 29*. One of the showy helmets of the Syrians, made of leather with metal ornaments, is represented in *fig. 30*; while *fig. 31* shows a peculiarly formed and often painted helmet of leather bound with iron, worn by the Armenians. The Scythian heavy armed infantry were clad in a leathern cuirass, strengthened by thin scales of iron, as shown at *fig. 32*, wore a leathern helmet bound with strong iron bands (*fig. 33*), and carried an oval, often richly ornamented shield of leather, covered entirely with metal plate (*fig. 34*). The bow (*fig. 36*) was with them only secondary, and was, therefore, small and light; but they carried clubs with long spikes, for blow or thrust, and maces set with iron spikes, as shown in *fig. 35*, where both are given. The short sword, or more properly long dagger (*figs. 37, 38*), they had in common with the Dacians, of whose leathern helmets, gaily painted and the head-piece studded with metal scales, an example is given in *fig. 45*; while *fig. 44* shows one of the Dacian field badges, such as were carried by the larger divisions of the army, and which were distinguished from each other by the most various forms. The Mysians had circular shields plated with metal, as in *fig. 39*, and javelins (*figs. 42, 43*), whose shaft was often carved in rings or spirals, with a counter-weight for greater momentum, and on this weight a short spike for close combat. Quite similar were the Thracian javelins, of which *figs. 40* and *41* give examples, save that the counter-weight was often nearer the middle. The Thracian helmet was of buffalo-hide, bound with iron. The skin of the head was often chosen for this purpose, with the horns kept on; often that form was merely imitated, and false horns added (*fig. 55*). The Thracian shield was

light and small, usually of the crescent form, and painted (*fig. 56*). The Phrygians belonging to the heavy infantry had short woollen tabards (*fig. 46*), usually embroidered in rich patterns, and often covered also with metal rings. Their helmets, of which *figs. 47* and *48* give examples, were imitations of the Phrygian cap, of buffalo leather, gaily painted, with a crest and neck-piece to deaden descending blows, and with cheek-pieces; frequently they were surmounted by a horse-tail. As indeed the whole equipment of the Phrygians displays superior elegance, so this appears also in their crescent-shaped shields of buffalo-hide, painted and adorned with iron rings (*fig. 50*), and in their bows and quivers (*fig. 49*). The Phrygian battle-axes (*figs. 51-54*) were light, sometimes long, sometimes short, and often with a point for thrusting. The axe was their chief weapon, and was usually broad-headed on one side, but narrowed to a point on the other, that it might smite through helm and shield.

THE MILITARY SYSTEMS OF MACEDONIA AND GREECE. The Macedonians and Greeks owing their existence to war, and involved constantly in hostilities on one side or another, were compelled to perpetual vigilance as to the perfection of their military force. Hence we find among them, at a very early period, a completely organized army and a peculiar tactic, which were so much the more necessary as the Greeks were not in a condition to maintain a very numerous force, and were, therefore, usually obliged to encounter their enemies with greatly inferior numbers, an inequality to be counterbalanced only by superior intelligence. Thus on the plain of Marathon fought scarcely 10,000 Athenians. Great armies were formed only by the union of several states; and at the battle of Plataea, where perhaps the largest Grecian army was collected, were numbered 111,000 men, of whom, however, only 38,000 were heavy armed, and of the light armed 37,000 were Spartan helots.

Grecian warfare, and therewith the formation of their military system, may be divided into three periods. The first is that of the Persian war; the second, that of the Peloponnesian or internal war of the Greeks to the time of Philip; and the third, that of the Macedonian, Achaian, and Ætolian wars, in which period fall the wars of Alexander the Great and the war with Rome. The expeditions of the Greeks before the Persian contest belong to the mythic age, and then, as indeed also in the commencement of the historical, Grecian warfare was in its infancy. The Grecian heroes still fought naked, though well armed (*pl. 2, fig. 1*). Of the wars of the mythic age, we shall mention only the Theban and the Trojan. The traditions which the poets give of these show that here only rude strength was brought into play, and even that so imperfectly guided, that the desired result was attained only after a long period, sometimes not at all, or by means of single combats, which were regarded as a kind of divine decision. Thus the Theban war terminated by the duel between two brothers, in which both fell, not to mention other single combats of similar character.

When Greece, however, was assailed by external foes, the Greeks held fast and firm together, and the greatest men of Greece devoted themselves to the organization of her warfare. They began to carry on war systemati-

cally; laid out plans by which they would endeavor to conduct the military operations; practised in peace the manœuvres required in war; studied their arms and means of defence, improving the old and inventing new. They devised and tested organizations for their army, so that were war declared, the army might be brought promptly into activity and consist of disciplined troops. The land force, however, though sufficient, was yet less perfectly organized than the naval, since the geographical position of Greece caused her enemies in almost every case to approach her by sea, so that the first and most decisive combat fell to the lot of the fleet. In the department of this work which is devoted to naval affairs, we shall find occasion to treat of the ancient Greek navy and its system, and we will confine ourselves here exclusively to the land force.

The Greek army consisted of infantry and cavalry. The infantry were either heavy armed (*ὀπλιται*, Hoplites), light armed (*ψιλλοι*, Psilites), or formed a middle class (*πελτασται*, Peltastes). The first had long spears (24 feet at first, afterwards somewhat shorter) and broad shields; the second had bows, javelins, and slings; the last, shields and short lances. The cavalry also were divided into light and heavy, and as middle class served a species of soldier who fought sometimes on foot and sometimes mounted. With the heavy armed both horse and rider were clad in mail; their weapon was a long spear, often pointed at both ends. The light armed had mail-less horses, and carried javelins or arrows. The heavy cavalry consisted of citizens, the light of mercenaries. The best horsemen were the Thesalian. Saddles and stirrups were not used; the horse was ridden bare-backed (*pl. 2, figs. 12 and 13*). The Athenian cavalry numbered at first only 69 men, but were afterwards increased to 1200. Before the introduction of cavalry, and indeed at the time of Homer, the armed chariot with partially mailed horses was used (*pl. 5, fig. 4*). These chariots were harnessed usually with two, but sometimes with three or four horses, of which, however, only the two inside drew; the others, merely guided by the reins, served only to increase the onset. Upon the car stood the warrior and the driver. One kind of these chariots had a sharp spike projecting from the pole, and sharp scythes set on the ends of the axles, as shown in the representation, and were called scythe-cars. The battle-cars were mostly two-wheeled, yet some had four wheels. At the time of the Persian war such battle and scythe-cars were still in use; elephants and camels were first used in the time of Alexander, who saw them in the Indian armies. The former carried turrets upon their backs, in which from ten to thirty soldiers were placed (*pl. 5, fig. 3*).

The arms of the Greeks were divided into offensive and defensive, or weapons of attack and of defence; and the former again into missiles and weapons of percussion, of which the last were most carefully perfected. The earliest offensive weapons were the club, lance, and javelin. The lance, of which *pl. 3, fig. 4*, and also the two preceding plates give various representations, was long—not less, indeed, than from fourteen to sixteen ells for the longest, the *Sarissa*, which was used by the phalanx; but there were also shorter ones, of four to six ells. The shorter had sometimes two points,

as in *fig. 4*. When the lance, however, was only three or four ells long, it was called a javelin, and each warrior had then from two to four of them, sometimes double pointed also (*pl. 2, figs. 3, 4*). The sword was usually straight, and very short, because it was a point of honor to let the foe approach closely. The straight sword (*pl. 3, fig. 14*), which was carried at the right side in a belt from the shoulder, had a broad blade, seldom any point, but a short cross-guard, and was used for cutting; there was, however, another and shorter sword (*fig. 16*), which served as a long dagger, and had no cross-guard. *Pl. 2, figs. 6, 7, 8, 10, 16, and 17*, show the manner of using both kinds. A curved sword is also frequently seen (*pl. 3, fig. 21*). This was very slightly bent, sharpened only on one edge, had a cross-guard, and, for better balance, was heaviest at the lower end. The sheath (*fig. 20*) was straight, like a quiver. The bow had various forms; thus, the Theban bow (*fig. 27*) had a single curve, while the Athenian was double curved, with a straight piece in the middle, for the better placing of the arrow (*fig. 17*). The bows were made sometimes of naturally curved wood or horn, sometimes cut out of hard close-grained wood; they were strung with sinew or horse-hair. When not in use they were thrust into the bow-case (*figs. 2, 3*). The arrows, of light wood and very long, were carried in a quiver (*fig. 2*), which hung usually over the shoulder on the left side, as with the Amazons (*pl. 2, fig. 2*), but was also often carried on the back; to its barbed head wisps of tow, dipped in pitch and lighted, were often fastened, for the purpose of setting fire to objects. The sling, with which stones, leaden balls, and often fire balls were thrown, consisted of several thongs, with a centre-piece in which the projectile lay, but was soon laid aside as the use of the lance came to be better understood. To defensive arms belong, first, the helmet; and with the Greeks this piece of armor had the greatest variety of forms, from the simplest skull-cap to the highest adornment. *Pl. 3, figs. 9, 10, 11, 12, and 13*, give examples of this, and on *pl. 2*, also, are various patterns. The helmet was sometimes of hide, studded with metal, and painted; sometimes entirely of wrought metal. The principal part was the cap, to which cheek-pieces were attached, serving as well to give a firmer hold upon the head as to protect the face of the wearer (*pl. 2, fig. 7*; and the trumpeter, *fig. 9*). Often, however, these parts were wanting in the helmet, while the neck-piece was never absent. Finally we remark the crest; this had often the strangest forms, as in *pl. 3, figs. 10 and 11*, but was usually adorned with a plume of feathers or horse-hair, which flaunted in the gayest colors; frequently, indeed, the plume was triple, as *fig. 13*; or there were other plumes at the sides, as *fig. 12*; or buffalo horns, as *fig. 10*. In most cases, a horse-tail floated from the lower end of the crest. Often the helmet had a vizor, to protect the face, as *fig. 9*; this vizor had holes for the eyes, and in combat was pushed down (*pl. 2, figs. 3 and 6*). The cuirass consisted of a breast and a back-piece, and extended from the neck to the hips, where it was held together by a belt. From the back-piece forward a plate passed over each shoulder, uniting the two halves at the upper part. *Pl. 3, figs. 18 and 19*, show cuirasses, one of which reaches below the hips, but the other has a row of metal plates, or leather straps covered with woven wire, which

protect the thighs and abdomen. On *pl. 2, figs. 3-8, 10, and 16*, show various kinds of cuirasses. The cuirass was usually of ox-leather, gaily painted and studded, plated or bound with metal. Sometimes, though only with the heavy cavalry, they were wholly of metal plate; but usually were merely set with scales (*fig. 7*); or the front-piece only (*fig. 5*) was a plate of metal. Frequently only the front-piece, the half-mail, was worn; particularly by the mercenaries, who were thereby deterred from flight, and by the light troops, for ease of motion. Later the cuirass was made of linen, doubled with a thick-quilted wadding. To this cuirass belonged a breast-plate of thin iron, lined with wadding, and worn close to the body under the cuirass; and a tabard without sleeves, worn also under the cuirass; often arm-pieces were added, which then extended from the shoulder over half the upper part of the arm (*figs. 16 and 17*). The Amazons, from the Black Sea, wore complete woven mail (*fig. 2*), and leggings set with scales. With the cuirass belonged also the greaves, or leg-pieces, of which *pl. 3, fig. 5*, shows, in the upper figure, the inside; and in the lower, the outside. These protected the shin-bone, and frequently the knee also from injury; were made of hammered metal plate, and fastened by two straps on the back of the leg (*pl. 2, figs. 4 and 10*); these greaves were usually ornamented; they were made also of thick woollen stuff sometimes, and then were closed behind (*figs. 3, 6, 9, and 17*). Soldiers wore usually on their feet soles of thick leather, sandals, which were fastened with straps around the instep and ankle; the cavalry wore a kind of boot (*pl. 2, figs. 12 and 13*) with falling tops. Lastly, we have to mention the shield. This was usually of willow wicker-work, covered with leather or metal plate, or else entirely of ox-leather; but always the verge, at least, was plated. The shields were often showily decorated, and painted with lively colors; sometimes they had peculiar emblems, a species of blazonry; they were usually of curved form, and had always two handles on the inner side, by means of which they were carried on the left arm (*fig. 3*). In the centre of the shield was generally an elevation, a point, the boss of the shield, partly to strengthen it there and make a protection from assault, and partly that arrows might glance from it more easily. The shield was large or small, according to the character of the troops. The heavy armed troops had large and long shields, covering the whole body. *Pl. 3, figs. 1 and 6* show rude shields, in front and side view; *fig. 7* shows the inside. The light armed troops and the cavalry had small, round, Argolic shields (*fig. 8*). The shields shown in *figs. 1 and 8* were used by the Thebans.

The army organization of the Greeks is rather complicated, but very systematic in arrangement. The first division is the *hekatontarchy*, a body of one hundred men, which separated into four files (*lochos*), consisting each of twenty-four men and a *lochagos*. Each file was again divided into two *decades*, and each decade into two *pempades*, under the *decadarchs* and *pempadarchs*, who stood in the ranks. Ten such hekatontarchies made a *chiliarchy*, commanded by a *chiliarch*, under whom two *pentacosiarchs*, chiefs of five hundred, and five *syntagmatarchs*, chiefs of two hundred, commanded. Two chiliarchies had again an especial commander, the

telarch or *merarch*. Four chiliarchies formed a *phalanx*, whose commander was called *strategos* (*phalangarch*); the double phalanx (8,000 men), however, was under a *kerarch*, and the quadruple (16,000) under a *hegemon*. The Macedonian phalanx was armed with long spears, and formed with a front of five hundred files, and depth of sixteen. The term, *phalanx*, was originally applied to a certain number of men, but came afterwards to signify the whole army drawn up in order of battle. On both sides of the phalanx cavalry was stationed, to cover the flanks.

The front and rear rank men were called *protostates* and *epistates*; those of the inner files, *parastates*. For the lochages of the protostates, who had ever to sustain the first attack, the strongest and bravest men only were chosen; equally important, however, were the posts of the rearmost ranks (*urages*), who had to be brave soldiers, as, in case of attack in the rear, they had to face about and repulse the foe. In the open phalanx six feet, in the closed three, and in the narrow phalanx only one and a half feet were assigned to each man. The last order bore much resemblance to the Roman *testudo* (tortoise) (*pl. 13, fig. 5*), only that it was quadrangular, and not covered over; although instances are found in which the circular form was assumed.

Half the phalanx was usually composed of light troops; the files were not over eight deep; two files made a *systasis*, two systases a *pentekontarchy*, and two of the last a *hekatontarchy* (128 men); each hekatontarchy had in addition a trumpeter (*pl. 2, fig. 9*), a standard-bearer, an adjutant, and a herald (*fig. 11*). Two hekatontarchies were a *psilagia*, of which two formed a *xenagia* (512 men), and four a *systremma*. Two systremmas were an *epixenagia*, four a *styphos* (4,096 men), and two stypha an *epitagma* (8,192 men), which had eight principal officers, namely: four *epixenages* and four *systremmatarchs*. The *peltastes* were a medium between heavy and light armed troops. They formed subsequently the body-guard of Alexander, the *leucaspides* or *argyraspides*, so called from their silver shields.

The cavalry, again, had a peculiar division. An *ile* consisted of 64 men; two iles were an *epilarchy*; two of which, 256 men, formed a *tarentinarchy*. The *hipparchy* contained 512 men, and two of these formed an *ephipparchy*; two ephipparchies a *tolos*, and two toloi an *epitagma* of 4,096 men. Two battle-cars were a *zygarchy*, four a *syzygarchy*, eight an *epizygarchy*, sixteen a *harmatarchy*, twenty-four a *keras*, and forty-eight a phalanx. The commanders of one elephant were called *zoarchs*, of two *therarchs*, of four *epitherarchs*, and of eight, that is of a *turma*, *ilarchs*. Sixteen elephants were an *elephantarchy*, thirty-two a *keratarchy*, and sixty-four a phalanx, which a phalangarch or elephantarch commanded.

The movements of the troops, as well in place as on the march, were very intricate. *Klisis* was a quarter-wheel to the right or left from a halt; *metabole* was the half-wheel, and was made either to the right or the left. Of the turnings of the phalanx we mention the wheel, *epistrophe* (*pl. 4, fig. 1*, wheel on a halted pivot), which was made from *a b* to *a c*, to the right or left; and on the outermost lochagos, *a*, of the halted flank as a pivot. When this wheel was reversed, it was called *anastrophe*

(*fig. 2*), and the movement was in the direction of the arrow from *a d b* to *a c*. The *perispasmus* (*fig. 3*) is a double epistrophe, so that the section describes a half-circle from *a d b* to *a c*. By this wheel the phalanx gained its whole depth to the rear, and presented the urages instead of the lo-chages to the foe. The *ekperispasmus* (*fig. 4*) is a triple epistrophe, in which the section *a b d* moves in the direction of the arrows, *a, c*. Changes of front were executed by countermarches as well as by wheels; the countermarch of a phalanx was either by file or by division, and each of these movements could be executed in three different ways. The Macedonian countermarch by file (*fig. 5*). The new front line is *AA*, the old *BB*; the enemy's line *C*. The first division makes here a metabole, while the other divisions file round close to the first, in the direction from *a* to *b*, and establish themselves in their former order, in rear of it. The Laconian countermarch by file (*fig. 6*) is the reverse of the preceding. *AA* is the new, *BB* the old front line; *C*, the enemy's position. It will be seen, that while by the first movement the phalanx gains its depth to the rear, by the second it gains its depth to the front. In this movement the last division, the urages, remain stationary, while the other divisions, *a, b*, and *c*, file round by the flanks, and establish themselves in the positions *d, e*, and *f*, when the urages face about. The Cretan, Persian, or Carian countermarch by file (*fig. 7*) differs from the others in having no changes of place, the phalanx only changing its front line. The file-leaders, *a*, face together to the right about and march, followed by their proper files, towards *b*, until the file-leader has taken the place of his rear rank man. The Macedonian countermarch by divisions (*fig. 8*) began always upon the flank which was nearest the foe *A*, and finished by the former left flank becoming the right. The Laconian countermarch by divisions (*fig. 9*) was a movement of attack, and began upon the wing which was furthest from the foe *A*; in this likewise the former left wing became the right, but established itself nearer the foe than before. In the Cretan countermarch by divisions (*fig. 10*), one wing took the place of the other without any change of ground.

Another manœuvre was duplication, *dipiasasmus* (*fig. 11*), and was effected in two ways, either by accession of force and thus without extension of front, or by opening the files, so that the front *a b* occupied after duplication the length *c d*. In this case the second division stepped into the intervals of the first, the fourth into those of the third, &c., the odd files, in short, next to the even. If, instead of the front, the depth was to be increased, the files opened to the rear, and the even files stepped behind the odd.

The order of battle of the phalanx was either parallel to the enemy, or, as in *fig. 12*, oblique, one wing being nearer to the foe *A* than the other. The vanguard was called *protaxis*, the rearguard *epitaxis*.

If a section of the phalanx was thrown forward and its place supplied from a supporting corps-de-reserve, this was called *parembole*; but if a section of the reserve attached itself to the right or left wing of the phalanx, or to both (*fig. 14*), this manœuvre was called *prostaxis*. *Entaxis* was when the light armed fought between the heavy armed, but if the light troops

formed "en-potence" on the flanks of the phalanx, in order to cover them, that was called *hypotaxis* (fig. 15). The march of the troops was either paragogic or epagogic. In the *epagogue* (fig. 16), the front was parted into subdivisions, which marched one behind the other (in sections). In the *paragogue* (fig. 17), the files faced to the right or left about, and gained ground by a flank movement. The flank nearest the foe was always strengthened. The column was composed of two or more phalanges; usually there were two of these, which marched with a flank of 32 files (fig. 18). Had a phalanx two opposite fronts, so that one half of it turned their backs to the other half (fig. 19), it was called *antistomos*. Were two phalanges so united that the lochages formed the two fronts, while the urages stood in the middle (fig. 20), they called this a *diphalangia* with two fronts; while the reversed position (fig. 21), where the lochages were in the middle and the urages formed the outer fronts, was the *diphalangic antistomos*. Finally, we must mention a particular form of diphalangia, namely that of two equal fronts (fig. 22), which arose where the urages of one phalanx and the lochages of another stood in the middle.

A particular order of battle was the wedge (*embolon*), which was either solid or hollow. The solid wedge (*pl. 13, fig. 3*, and *pl. 4, fig. 25 a b c*), which Ælian describes, was a triangle at whose apex *c* a single man, or according to others, three men stood. The hollow wedge (fig. 23) was formed when two phalanges, *a b* and *c d*, so united, under an acute angle, that the flanks *b* and *d* met at the vertex. This order of battle was used to break with irresistible force the hostile ranks. The reversed wedge, *koilembolon* (fig. 24), had the open side made by the phalanges *a b* and *c d*, from *b* to *c* turned towards the foe, and was used to inclose the hostile wedge, wherefore this manœuvre was called the *forceps*. The *rhombus* was a combination of the embolon and the koilembolon. Here belongs also another order of battle, which was called the *boar's-head*, and which is represented in *pl. 4, fig. 30*. It will be seen at once that it is really nothing but a solid wedge, as the sections *a b, c d, e f, g h, i k, l m, n o, p q, r s, t v*, and *v* are integral parts of a phalanx (*pl. 13, fig. 4*). The simplest order of battle, however, and therefore generally the best, is the square, which was likewise applied in various ways by the Persians and Greeks. That this square should have a good proportion for cavalry, it was requisite that the front should be at least twice the depth, and thus the *ulamos* of the Spartans had ten horsemen in front and five in file, in all therefore fifty men. For a perfect square, three men were placed in front on one in depth. The *plaision* was an oblong figure inclining to oval, and the *plinthion* was in the form of a parallelogram. Here belongs also that arrangement of the phalanx which was not rectilinear, namely the concave phalanx (*pl. 4, fig. 27*), in which the flanks were thrown forward and the centre retired; and the convex phalanx (fig. 26), in which the flanks were retired and the centre advanced. In actual combat, however, these evolutions were not carried out exactly as represented in the above figures, but a movement as in *figs. 28 and 29* found preference, which nearly resembled our formation in echelon.

The strategoi gave their commands, when possible, by the voice alone ; when this was drowned by the roar of battle, they had the *trumpeters* (*pl. 2, fig. 9*), *adjutants*, *hyperetes*, and *heralds* (*fig. 11*), which last were distinguished from the other troops by their dress, and were inviolable. Besides these, numerous other persons were attached to the army, as the field-surgeons, sutlers, and overseers of war-machines and baggage. The last marched in front or rear of the army, on the right or left flank, or in the centre, the latter only when attack was expected from various quarters.

The combat ended, the slain of the victors were buried, but in the earliest times those of the conquered left to the beasts of prey. Afterwards this usage was abandoned, and instead the Greeks often took their dead home with them for burial, or burned them and sent home the ashes. At the funeral and after the same, a death-feast (*pl. 5, fig. 1*) was held, in which orators celebrated the deeds of the fallen heroes. As an instance of sepulchral rites upon a grand scale, we here mention the funeral procession of Alexander the Great (*pl. 6, fig. 1*) ordered by Ptolemy. The coffin was of gold, and in it lay the king's body wrapped in spices ; over the coffin was a gold-embroidered purple tapestry, and thereupon Alexander's armor. Over the car arched a golden canopy set with jewels ; this was 15 feet 11 inches broad and 17 feet 7½ inches long. Beneath the canopy stood a throne of gold adorned with raised work, and over this a crown. At each corner of the arch stood a golden Victory, bearing a trophy. The peristyle of Ionic columns, upon which the canopy rested, was also of gold, and behind it a golden net, adorned above with paintings, which formed as it were the cella of a temple, before which two lions kept watch. The whole rested upon a platform which was supported on two axles, having each two Persian wheels, whose naves and spokes were gilded. Golden lions'-heads, holding a javelin in their jaws, formed the end of the axles. The car itself was so artfully constructed, that even inequalities of the ground did not disturb the perpendicularity of the structure. This car had four poles, and to each sixteen mules were harnessed, four abreast, each mule wearing a small golden horn, a jewelled neck-band, and little bell. This whole equipage made the journey from Babylon to Memphis (700 miles) without accident.

THE ROMAN MILITARY SYSTEM. With respect to the military system of the Romans in the earliest times our information is very defective, yet the writings of Livy teach us that even in the age of the kings their warfare had already begun to elevate itself into a certain regularity. At the time of Romulus the people were divided into three *tribes* of ten *curiæ*, and each tribe was required to furnish 1000 foot and 100 horse. This army was commanded by three *tribunes*. In addition to this they had 300 cavalry, *celeres*, for the king's body-guard. Under Servius Tullius, who divided the people into four tribes, the strength of the legion was increased to 4000 foot and 400 horse. All were divided into *centuries*, so that there were forty centuries of foot and four of horse. Tullus Hostilius and Tarquinius Priscus increased the army yet further. The armament took

place according to the census which Servius Tullius introduced, who also increased the cavalry to 2400 men. The first class of citizens had Argolic shields, spears, cuirass, iron skull-caps, greaves, and swords, and formed the van. The second class had the same weapons, with no cuirass, but long shields; they formed the second line. The third class had neither cuirass nor greaves; the fourth only large shields, spears, and swords; the fifth class were armed only with slings and javelins, and stationed outside the main order of battle, which was very similar to the Greek phalanx. The sixth class, the paupers, were free from military service. The cavalry was chosen from the richest and most distinguished citizens.

The first improvement which the Romans introduced into the Grecian order of battle was the division of the phalanx into three lines: the *hastati*, *principes*, and *triarii* or *pilani*. The *hastati* (*pl. 7, fig. 13*) formed the first line, and had light javelins; the *principes* (*fig. 14*) stood in the second line and were heavy armed; they formed the main body, and had heavy javelins. The *triarii* (*fig. 15*), who made the third line, the reserve, had also heavy javelins, afterwards lances. The *velites* (*fig. 12*), light troops, had very light javelins and round shields; in rapid attacks they sprang up behind the cavalry on horseback and dismounted on reaching the required spot.

The Roman *legion*, which under Servius Tullius was 4400 strong, was increased after the battle of Cannæ to 5000, and under Marius to even 6000, which was its strength also under the emperors. Each *consul*, of whom there were two, had the guidance of two legions, so that the consular army consisted of four legions. The troops were chosen from the 35 tribes in this manner: from each group of four equal sized men, each tribune alternately chose a man; after selection, and the administration of the oath of allegiance, each legion was divided into two parts, the heavy and light troops. Of those between 17 and 25 years of age, 1200 were light armed; the remainder were divided into *hastati* (from 25 to 32), *principes* (32 to 40), and *triarii* (40 to 45), and then the legion received its standard and field badges. *Pl. 10, figs. 1 and 2*, show legion-eagles; *figs. 3 and 4* standards; and *figs. 5-15* various field badges of the smaller sections. The standards of the infantry were called *signa*; those of the cavalry, *vexilla*. The principal standard was of gold and purple; some were striped. The field badges were adorned with wreaths, turrets, and likenesses of different emperors and heroes. The standards and badges were carried by chosen, trusty men, standard-bearers, *signiferi* (*pl. 7, figs. 16 and 17*). They wore usually the skin of a lion or bear.

During the monarchy the kings were themselves commanders-in-chief of the army; in their stead came afterwards the consuls and the *prætors* with their *legates*. The two consuls had chief command on alternate days, To the consuls followed in rank the tribunes, then the *centurions* (*figs. 18 and 19*), who commanded 100, and the *decurions* or *decani*, who commanded 10 men. In the time of the republic the *dictator* was commander-in-chief and named his own subordinates.

The *Imperator* (general-in-chief) (*pl. 8, fig. 1*) filled one of the first places in Rome; to him the soldiers swore fealty; he had before him, as token of

the highest power, the *lictor* (*pl. 8, fig. 3*), an officer of justice, who also executed the sentence of death, and behind him a crowd of officers and soldiers (*pl. 8, fig. 4*, and *pl. 5, fig. 2*). He named the legates (*pl. 8, fig. 6*), whom the Senate confirmed, and who commanded next himself. They were men of courage, experience, and foresight, usually had served a consulate, and were employed also in concluding treaties. After the prefects came the tribunes (*fig. 2*), whose position we have already mentioned; but the proper magistrate for the army was the *prefect* of the legion, in the absence of the legate the commander, from whom the tribunes, &c., received the directions for guard-duty, watchword, &c., and the supervisor of all the munitions of war.

Each of the divisions of the infantry of the legion was subdivided into 15 *maniples*; in all, therefore, into 45. Each maniple had 60 common soldiers, two (*triarii* only one) centurions, and a signifer. To each maniple of the *hastati* belonged also 20 men of light troops. The *principes* had no light troops, but the *triarii* had 30 *vexilli* to every 60 men, a centurion and a standard-bearer; half of these were called *rorarii*, the other half *accensi*. At the time of the Punic wars, however, the number of maniples in the legion was reduced to 30, but their numerical strength, except among the *triarii*, was doubled; so that a legion consisted of 1200 *hastati*, 1200 *principes*, and 600 *triarii*, to which are to be added 1200 light troops, who were divided equally among the 30 maniples. Each legion was further divided into ten *cohorts*, each of which contained always three maniples of the three several arms. Every Roman soldier had his prescribed place in time of battle, which he might not change without orders, and thus each *decury* fought independently. The auxiliaries were usually attached to the legion, forming, as it were, light troops. They were either Italian nations, as the Etruscans, one of whose archers is shown in *pl. 2, fig. 14*, and in *figs. 15, 16, 17*, and 18, a horn-blower and other soldiers; or Samnites, or other nations in alliance with the Romans. *Pl. 7, figs. 1 and 2*, show commanders of such Italian allies; *fig. 3*, a Samnite; *fig. 4*, an African; *fig. 5*, a Sarmatian; *figs. 6 and 7*, German confederates; and *pl. 8, fig. 5*, Sarmatian mailed horsemen.

Of the other light troops belonging to the Roman armies we mention here: 1. The slingers (*pl. 7, fig. 10*), who rendered very good service in war; the most renowned were those of the Balearic isles. 2. The javelin-men, who fought with darts and javelins which they threw by hand. The Carthaginians and Romans employed these against cavalry. 3. The archers (*pl. 2, fig. 14*), who shot arrows and even short darts from a bow. 4. The dart-men, who had barbed darts which they threw by hand, and which were attached to a thong so as to be drawn back after they had struck, rendering the wound usually fatal. 5. The crossbow-men shot round pebbles and bolts from crossbows. 6. The *ferentarii* had slings, javelins, and stones, which they threw with the hand only; they were always in the van of the army, and a portion were mounted. They were employed also to bring fresh weapons from the magazines to those who had expended their supply.

The field-music of the Romans was designed principally for giving the requisite signals in time of action. For this were employed the *tuba* or trumpet; *buccina*, the bugle-horn; and *cornu*, the common horn. Of the *tuba* there were six different kinds, part of metal and part of reed; they were perfectly straight, and grew larger towards the lower orifice, which was often in the shape of a lion's head or dragon's jaws.

Pl. 7, fig. 8, shows a Roman trumpeter (*tubicen*) as he went into battle; like the standard-bearer, he wore usually, instead of helmet, the head skin of a lion or tiger. The *buccina* was also of metal, and was bent into the circular form; *fig. 9* shows a horn-blower (*buccinator* or *cornicen*) equipped for battle. The horn, *cornu*, was a common ox-horn, usually silver-mounted. The army knew by the note of the horn whether it was to halt, advance, or retreat. Besides these musicians, however, the army had also shalm and cithern players. When the standards were to advance the signal was sounded with the horns, otherwise with the *tuba* only; but the chief signal was given with the *buccina*, by order of the imperator, beside the *prætorium*; thus also was proclaimed the completion of an execution.

The legionary cavalry was raised from that part of the equestrian order (the *equites*) who were assessed at 10,000 *asses* (\$1000), which was increased afterwards to 400,000 *sestertii* (\$20,000). They received their horses from the state. Towards the close of the republic the *equites* freed themselves from the service, and the cavalry then consisted principally of foreigners. (*Pl. 8, fig. 8*, a decurion of cavalry; *fig. 9*, a cavalry soldier; and *fig. 7*, two standard-bearers of cavalry. The cavalry of a legion amounted usually to 300 men, or one horseman to ten foot soldiers, yet that proportion was now and then violated, particularly in later times; in the confederate legion the cavalry was double this strength. The 300 cavalry were divided by the tribunes, according to the number of maniples composing the legion, into 30 decuries, or, according to the number of cohorts, into 10 *turmæ*, so that a *turma* contained 30 men. Each *turma* had three decurii, of whom the first led the *turma*. The *turma* had besides three *uragi*, who closed the files, and an ensign. At the time of Vegetius the *turma* was twice as strong; it was arranged in three and also in six ranks.

The dress of the Roman soldier consisted of a robe reaching to the knee, under which he wore the tunic; around it was girt the sword-belt. The breeches, where any were worn, were of leather, and reached to the calf. On the feet he wore half-boots or sandals. The hair was cut short. In winter the soldier wore also a cloak with a hood, with which he could protect the neck and head.

The arms were either offensive or defensive. The light-armed troops were at first the *ferentarii*, *rorarii*, and *accensi*, but in the year 542 A. U. C., the *velites* (*pl. 7, fig. 12*) were instituted. The arms of the *velites* were, 1. a short sword (*pl. 3, fig. 49*); it was pointed and very sharp, designed for cut or thrust: 2. seven small javelins, of which the staff was an inch thick and four feet long; the iron head, nine inches in length, was very slender, and bent with the first throw, so that the enemy could not send it back:

sometimes a long thong was fastened to the spear, so that it might be drawn back after projection; but in that case the spear was barbed (*pl. 3, fig. 28*): *3*, a shield of wood covered with leather; it was round, and three feet in diameter (*pl. 7, fig. 13*). The head covering was a cap of wolf-skin or cow-hide, in the form of a helmet; metal helmets the velites had not. The rest of the infantry, the hastati, principes, and triarii, carried a shield; its form was very various, and equally so its style of decoration; but the usual dimensions were four feet, or four feet four inches high, by two feet six inches wide in the middle, so that the bearer could be entirely concealed behind it. They were a rounded oblong, as in *pl. 3, fig. 48*, or an oval, cut off at top and bottom (*fig. 46*), or hexagonal (*fig. 45*), or the same breadth from top to bottom, and concave, as if cut from a hollow cylinder (*fig. 47*). At first, the shield was of doubled leather only; afterwards of wicker-work, covered with copper-plate; and finally of tough wood, with a covering of leather or metal; or, indeed, cast entirely of metal, and even of gold or silver.

The shield of jointed wood, when covered only with leather, had always an iron rim to turn off the blows; and in the centre a raised piece, the boss, for the better glancing of arrows and stones. The shields were in part painted, sometimes by cohorts uniformly, in part decorated with raised metal ornaments; and were often very costly when belonging to the higher officers. The soldier had further two spears; one of them strong, either round or square, and two and a half inches in diameter, so that it filled the hand; the small one was a javelin, and almost like an arrow; the shaft of each was about six feet long, and the head had branches running back the whole length of the shaft, to strengthen it against blows and fracture. Sometimes, though seldom, the spear had two heads (*pl. 3, fig. 48*). The helmet was of leather at first, studded with metal, and of the simplest form, with a neck-piece and crest (*fig. 36*). Afterwards the helmet was made entirely of metal, and often very splendid; it had neck-piece and cheek-pieces, but no visor, like the Greek helmet; the crest was adorned with an erect plume, usually of purple feathers (*fig. 37*); frequently with a red comb also, a crest of hair, or a horse's mane. The cuirass was of metal or leather, and reached from the breast to the girdle. The arms, from the shoulder half way to the elbow, were likewise covered with metal plates. The cuirass was set with scales or rings, or interwoven with chains; there were even some very fine ones made entirely of rings, and covering nearly the whole body; generally the form and adornment of the cuirass were very various, and regulated only by the means and taste of him to whom it belonged. *Pl. 3* shows various forms of the cuirass; *fig. 41* is the cuirass of a Roman emperor, of silver inlaid with gold, and with purple fittings; *fig. 40* is the cuirass of a general officer, also richly bedecked; *fig. 42* shows the front, and *fig. 43* the back of the plate-mail cuirass of a triarius; *fig. 44* a scale cuirass of Trajan's time. The poorer soldiers wore, instead of a cuirass, only a breast-plate, broader above than below. The greaves were like the Grecian, but gave way afterwards to half-boots, which were often set with scales of metal. The sword, which up to the time of Vespasian was carried on the right thigh, where, after its removal to the left side, its

place was supplied by a dagger, hung at first from a belt, but afterwards from a baldric; its short blade was broad and strong, very sharp and pointed for cut or thrust; it had a cross-guard, and usually a richly decorated scabbard (*pl. 3, fig. 50*).

The cavalry armament, at first very simple, was subsequently arranged after the pattern of the Greek cavalry. Their defensive arms were helmet, cuirass, round or oval shield of about three feet diameter, and half-boots, usually set with scales. The offensive arms were, a sword, longer than that of the infantry, and adapted for striking only; a dagger, and a two-pointed lance, which was used, however, only at the first onset. The horses had leather housings, strengthened often about the head and breast with iron scales. *Pl. 9, fig. 47*, shows an ancient Roman saddle.

The arms of the allies were very various. *Pl. 3, figs. 22 to 35* give those of the Samnites and Etruscans; *fig. 22* is a Samnite leathern cuirass, with metal neck-band or ring-collar; *figs. 31 to 35* are various forms of Etruscan cuirass, as well leathern (*figs. 31 and 32*) as scaled (*fig. 33*); cross-plated, as *fig. 34*, or with plates running up and down, as *fig. 35*. Of the helmets *figs. 23 and 24* are Samnite; these leathern, metal-plated helms are distinguished by having a protection for the face, which with the Romans was always left free. The helm (*fig. 23*) is evidently the prototype of the knight's helmet in the middle ages. *Figs. 29 and 30* are Etruscan helmets; *fig. 29* is a leather cap, with a large crest of plate-iron; *fig. 30* resembles the old Grecian helmet. *Fig. 26* is the leather cap of the Samnite archer. The Samnite shield (*fig. 25*) is entirely of wicker-work, covered on both sides with leather, and has the cylindrical form (*fig. 47*); the Etruscan circular wooden shield, metal plated throughout, was about three feet in diameter. The Samnite bow (*fig. 27*) is simply cut from curved wood, with hardly any artificial bend.

The arms of the Gauls and Franks we find on *pl. 9*. *Fig. 1* is a Gallic cuirass, as Julius Cæsar found it; *fig. 2*, a Gallic shield of wicker-work, covered with leather, and richly painted; *fig. 3*, the Gallic spear, nearly like the Roman, only shorter ironed, and with a four-edged head; *figs. 4 and 5*, bows and arrows, like the Greek. The Gallic sword (*fig. 6*) was either short, with a small cross-guard and broad blade, for the infantry alone, and for striking only; or considerably longer, with a large cross-guard, and blade often three inches broad, for cut and thrust, for the cavalry. Besides the sword, the Gauls carried maces (*pl. 9, fig. 7*), strong, heavy blocks of wood or iron, set round with points, and on a short handle; a terrible weapon, which neither shield nor helm could easily withstand. The Gallic helmet was cast or hammered from bronze, in rather rude forms, and exhibiting, in almost all cases, the head of some animal as its pattern. Thus the helmet, *fig. 10*, displays two horns; *fig. 11*, with the rough, bell-like form, a horse-plume and mane; *fig. 9*, approximating to the Roman form; a horse-hair comb, with the ears and mane of a horse. A singular form is that of *fig. 8*, which is set like a war-club, with long, stout, iron points. The Gallic troops had, like the Romans, field badges; but instead of the Roman eagle they carried the Gallic cock (*fig. 12*), which is at this

day their emblem. *Pl. 7, fig. 11*, shows two armed Gauls. The Frankish helmet is merely a rude cap of ox-hide, with an iron crest (*pl. 9, fig. 13*).

The sword (*fig. 14*), like the Roman, short, broad, and pointed, but without cross-guard, was only for stabbing, and the spear with a broad, four-edged head, was provided with a loop of cord or leather. *Figs. 15–21* show specimens of German weapons. The shields were of wicker-work and quadrangular, somewhat vaulted, in *figs. 15* and *16 a*, adorned with an inlaid or interwoven pattern, or they were of wood, bound at the edge with metal, as *fig. 16 b*. The spears (*figs. 17* and *18*) resembled the Roman, but had shorter heads, and the swords were also like the Roman, only considerably longer, as much as three feet in length; *figs. 20* and *21* give specimens. The sword was carried on the left thigh by a chain over the shoulder. The Germans were often armed besides with a heavy club of oak wood (*fig. 19*); helmets they had none, as in war they wore usually for a cloak the skin of some wild beast, the head of which was made to cover their own (*pl. 7, figs. 6* and *7*). Sometimes they wore also a kind of sleeved cuirass of leather, with breeches and half-boots of the same, but often they marched naked to battle.

The kindred race to the German, the Saxon, afterwards Anglo-Saxon and Anglo-Dane, varied little from the Germans in their equipment, wherefore we shall at once insert them here. *Pl. 9, figs. 32, 35, 36, and 37*, show Anglo-Saxon helmets, which were nothing more than caps of thick leather, studded here and there with iron, and sometimes provided with a narrow visor, to protect the face from sun and rain. The Anglo-Danish helm (*fig. 43*) is nothing more. The Anglo-Saxon cuirass (*figs. 33, 34*) is a close-fitting leathern jerkin, of several overlapping layers of leather cut scale-shaped, below, and sometimes covering also the shoulder and upper-arm, as *fig. 34*; the Anglo-Saxon shield (*fig. 32*) was oblong, three and a half feet high and three feet broad, after the manner of the Roman, of wood, with iron-bound verge, and boss; but the Anglo-Danish (*fig. 38*) was of wood, plated with leather or metal, after the manner of the old Grecian, carved in artistic form and proportionately small, as for the light troops of the Roman army. The Anglo-Saxon sword (*fig. 32*) and the Anglo-Danish (*fig. 44*) resembled entirely the broad, short Roman sword; the spear also (*figs. 32, 39, 40*) was like theirs in length and strength, but the head was usually barbed, or had tassels of wool, or a kind of cross-guard, which seemed not without use. Instead of the German club, the Anglo-Danes had a mace, as *figs. 45* and *46*, and battle-axes, either edged on one side and pointed on the other, as *fig. 41*, or an axe formed on both sides, as *fig. 42*. The Anglo-Saxon horsemen had saddles, as *fig. 48*.

The Britons had weapons differing in many respects from those above described. The helmets were at first thick leather caps, adorned at the vertex with feathers (*figs. 30* and *31*); afterwards the cap was forged or hammered from metal in the same form and provided with a visor, as *pl. 3, fig. 38*, or with cheek-pieces also, as *fig. 39*.

Of the decorations of the Roman helmet we find not a trace. The shields were circular, scarcely three feet in diameter, often indeed smaller

(*pl. 9, fig. 22*), of wood strongly plated with metal, the nail heads forming knobs, and the boss projecting into a sharp spike. The sword was very short and pointed, fit only for stabbing (*fig. 29*). The spear had a rather elongated head, either needle-shaped as *fig. 26*, or in the shape of a myrtle leaf (*fig. 25*), but with a projection at the upper part which prevented its penetrating too far. The spear, like *fig. 26*, was shorter, for throwing, while *fig. 25* was long and used only as a pike. War-clubs also were used by the Britons as by the Gauls, sometimes set with points, as *fig. 28*; sometimes quadrangular, and running out into a point, for blow and thrust, as *fig. 27*. The battle-axe (*figs. 23 and 24*) was bladed only on one side, and was wielded with both hands. *Pl. 7, fig. 5*, is an armed British warrior. The cuirass was of leather with metal scales or rings.

The order of battle of the Roman legion is shown in *pl. 13, fig. 2*, for four legions. On the day of battle the Roman legion always took the centre of the line, while the allies and the cavalry covered the flanks, or were held in reserve. The legion was divided into its maniples, and further into three lines, so that always the ten maniples of the hastati made the first line, *aaa*, the principes the middle, *ccc*, and the triarii the last line, *eee*. Between every two maniples such an interval was left, that the maniple of the second line could march through unimpeded, and the maniples of the rear ranks were opposite to the intervals of the line in front, so that the principes were opposite the intervals of the hastati and the triarii opposite those of the principes. This is the well known quincunx disposition, as mentioned by Polybius at the battle of Zama. Between the hastati and the principes was a considerable interval, *bbb*, the depth of a maniple, and between the line of the principes and triarii another much greater, *ddd*, in which war machines were placed. If the first line was compelled to give way, it drew back into the intervals of the next, or the second advanced for reinforcement into the intervals of the first. The light troops, bowmen and slingers (*pl. 13, fig. 2 h h h*), commenced the attack. The reserve we see stationed in the great legion-interval of the triarii. Were the two foremost lines compelled to retreat upon the triarii, then the army fought in one line, from behind which the light troops, with slings, darts, and arrows, galled the advancing foe. On the flanks were the cavalry, *ff*, and the allies and confederates, *g*. At *i* was the position of the chief officers, the eagles, the tribunes, the first maniple of the triarii, and the élite of the confederate infantry and of the cavalry.

Fig. 6 shows the Carthaginian order of battle with elephants, as it was assumed before a hostile position; *a* was the position of the enemy; *b*, the entrenchment before it; *c*, the infantry, and *d*, the war elephants, which advanced through the intervals of the infantry; *e*, are the columns of cavalry.

When an action was victoriously ended, the general lauded the assembled warriors, embraced the leaders, and thanked them and the army (*pl. 11, fig. 2*). Those who had distinguished themselves by especial bravery in the fight were personally praised and rewarded. The rewards were various. Particularly remarkable among these are the crowns: 1. The

triumphal crown, or crown of victory, of laurel leaves at first and afterwards of gold (*pl. 10, figs. 16, 17*), which was presented to the general by the confederates and nations, and in the triumph was borne foremost. 2. The *corona obsidionalis* (*fig. 18*), which was given to him who had relieved a besieged city or camp; it was woven of grass from the rescued place, and was a very precious reward, as it was seldom given. 3. The civic crown (*pl. 10, fig. 19*) of golden oak leaves, was given in war to a citizen who had saved the life of a fellow citizen, and bore the inscription, "*Ob civem servatum*;" it was one of foremost distinction; all others were inferior to it, though it was the same whether the life preserved was that of a peasant or a king. 4. The mural crown, received by him who in the assault first mounted the wall of a besieged city; it was of gold. 5. Another mural crown (*fig. 22*), given to him who first scaled the enemy's entrenchment. 6. The naval crown (*fig. 23*) was the reward, after a sea-fight, of those who first boarded an enemy's ship; some part of a vessel was represented upon it; this, like the mural crown, was of gold. The myrtle crown (*fig. 21*) was of myrtle leaves and oval; the general wore it when he marched triumphant into Rome.

On a victory gained, medals were struck also, having the likeness of the general and other emblems, with an inscription touching the facts; *figs. 24* and *25* give such medals; the first was struck by the Senate on the victory of Trajan over the Dacians, the second for a victory over the Germans. The Greeks erected trophies upon the field of battle. The Romans also did this, and the trophies were always made of conquered arms, with inscriptions commemorating incidents of the campaign or battle. The generals had such trophies made of marble also, and set up in Rome. Two of these (*figs. 26* and *27*) have come down to our own time, and Pope Sixtus V. adorned the Capitol with them. Triumphal columns also were erected in memory of great victories, and for sea-fights naval columns, which were adorned with the beaks of captured ships. For the victory of the land forces similar columns were erected, and the most remarkable of these are still in existence, one to Antoninus Pius, and one to the Emperor Trajan after the conquest of the Dacians, both in Rome. *Fig. 28* represents the last; it is 118 feet high, and consists of 34 blocks of marble; upon its summit stood a statue of the emperor, 23 feet in height, now replaced by an image of St. Peter; within the column is a winding stair, which is lighted by 43 small openings; on the shaft the victories of Trajan are represented in half relief, 2500 figures, which for the study of ancient costume, manners, customs, and arrangements, are of the greatest value.

The triumph was the greatest honor which the Roman people could extend to its generals. *Pl. 11, figs. 3, 4, 5*, and *pl. 6, fig. 2*, give representations of such triumphal processions. The general to whom a triumph was awarded must be at least Prætor, Consul, or Dictator, and a Roman citizen; the victory must have been gained over a nation, not over pirates, robbers, or the like; not less than 5000 of the foe must have fallen, and the enemy must not have been defeated in a foreign province. The general solicited the triumph, and it was either the great triumph, in triumphal

chariots, &c., or only the ovation, in which the general went on horseback, that was granted. The solemn procession commenced on the Field of Mars, and went from the Porta Triumphalis over the principal places in the city to the Capitol. The streets were strewn with flowers. Singers and musicians commenced the train; then came the animals destined for sacrifice, richly adorned; then the booty captured from the foe, partly carried (*pl. 11, fig. 4*), partly on peculiar trophy-cars (*fig. 5*), and the models and names of captured and conquered cities and people on separate tablets (*pl. 6, fig. 2, left*), in front of which the conquered generals and other captives were led by the lictors, their fasces bound with laurel. After these came the triumphal chariot (*fig. 2*), or else perhaps an elephant (*pl. 11, fig. 3*) with a throne, upon which stood the Triumphator, clad in purple robes and bearing a branch of laurel or an ivory sceptre. The chariot was drawn by four white horses, in later times by elephants, and was richly gilt and inlaid with ivory. The friends and family of the Triumphator and many citizens accompanied the chariot, as also the consuls and senators. The legates and war-tribunes surrounded it on horseback. The victorious army, bedecked with laurel twigs and tokens of honor, closed the procession.

The various punishments with the army were very severe, often indeed cruel. To be passed under the yoke (*fig. 1*) was a punishment for the whole hostile army when vanquished. The victorious foe had a yoke made of three spears, by striking two upright in the ground and fastening the third across them at top; through this yoke the conquered must march naked, having first laid down their arms; the chiefs were led foremost in order of rank, and then came the whole army.

From the connexion in which the Germans stood with the Romans, some peculiarities in the war customs of the former people may be introduced here. The Germans were a brave and very warlike nation; even the plays of their children were all martial, and the weapon-dance was the youth's greatest delight. This is shown in *pl. 12, fig. 1*. The youths either wound in various mazes between outstretched swords and spears, or else ran upon them at full speed and avoided them by dexterous movements of the body. Men and maidens gazed upon the sports, and praised the dexterous and skilful. When the youth attained manhood, he received the right of bearing arms (*pl. 12, fig. 2*), the elder of the family bestowing upon him sword and lance, while the mother or sister brought the shield. This freedom of arms was bestowed in the assembly of the people, so that all were witnesses of the oath taken by the youth to his father and the nation. Before a battle, an oracle was consulted as to the issue (*fig. 3*). They betook themselves to the Druid Grove, and the priestess, the druid, or a priest made known to the army the decision of the gods. Only in the last necessity, and when hotly assailed, did the Germans ever engage, unless the druids had prophesied victory. When the combat had once begun, then all took part therein, and a true strife of extermination commenced (*fig. 4*); even the women seized weapons.

Of the order of battle and the army movements of the Romans, and how the former was by degrees perfected, we give the following outline.

The first order of battle assumed by the Romans was very like the Greek phalanx. *Pl.* 4, *fig.* 31, shows such a disposition in one line; BB is the line of the infantry; and here four legions, with very narrow intervals, form a complete phalanx. The cavalry was posted on the flanks at AA, and the light troops form the line CC. This disposition, however, was soon abandoned; in its stead, the manipular disposition was introduced (*fig.* 32), in which the maniples were established in one line, with intervals between each maniple; the equites formed here the advanced line BB; then came the line of the legion AA, made up of single maniples; and lastly the light troops CC, who, after having made the first onset, retired behind the legion. The intervals meanwhile remained open only until the light troops and cavalry had retired through them; then the files opened, so that each soldier might have free space for combat, and thereby space was made in which the horsemen used to support the wearied foot-soldiers. Such was the order of battle to the time of the consulate. Under the consuls, however, the so-called quincunx was first adopted: *fig.* 33 shows this. In the first line, AA, stood the hastati; and in their front the light troops, in two ranks, as shown by the shading. Each maniple of sixty men, and twenty light armed, had a front of ten, and the intervals were equal to the fronts. The maniples of the principes stood in like strength and front behind the hastati, but so that each maniple of the second line BB was opposite an interval of the first. At first, the principes occupied the foremost line (whence their name), but in the new disposition it was held better to place the younger people in the first line, and the elder, principes, as the firmer and more experienced, in the second. The third line, CC, was held by the triarii, who were again stationed on the intervals of the second; the rorarii, light armed troops, formed the fourth line DD, mostly bowmen and slingers, who made the first attack, and then retired through the maniple-intervals to their assigned place. The fifth line, EE, was formed by the *accensi*, or troops who were posted as a reserve, and from whom the maniples of the foremost lines were recruited. Regulus improved on this disposition of the quincunx, by increasing the depth of the maniples one third, and giving the legion, instead of fifteen maniples front, only ten (*pl.* 4, *fig.* 34). The light armed troops now formed a complete line, AA; the maniples of the hastati the line BB; of the principes the line CC; and of the triarii the line DD.

Later this disposition by maniples was abandoned, and that by cohorts was introduced, every two maniples of the same line being united to form a cohort. *Fig.* 35 shows this disposition: AA are the five cohorts of the principes; the plan of placing the hastati on the first line being now given up, and their cohorts forming the second line BB, stationed on the intervals of the first line; the third continuous line CC was made by the light troops, who so established themselves after their first onset; and the fourth line, DD, was held by the triarii. At this time great value began to be placed upon projectile weapons, and the heavy armed received, in addition to their former equipment, five darts loaded with lead.

At the time of the civil wars the distinction between hastati, principes,

and triarii ceased, and Cæsar formed legions of ten mixed cohorts of four to five hundred men, which he so placed (*fig. 36*) that the first line contained four cohorts, and each of the others three. The depth of the cohort, at this time, was ten files. The intervals of the third line were such, that the cohorts of its right and left flanks were exactly in rear of the corresponding cohorts of the first line, while the centre cohort exactly covered that of the second line, and the interval between the second and third was greater than that between the first and second lines. Under Augustus, however, another order of battle was adopted (*fig. 37*), the third line being done away with, and the cohorts receiving at the same time a different division. The first consisted of 1,105 foot and 132 horse, and carried the eagle of the legion as well as the image of the emperor; the remaining cohorts consisted of only 555 foot and 66 horse. The first formed, in two divisions, the right wing, and then came the four others, of which the central cohort (³) and the flank cohort (⁶) were composed of the best men. The five following cohorts made the second line; and of these also the flank and centre cohorts (⁶, ⁸, and ¹⁰) were of picked men. The intervals between the cohorts had only half the breadth of their fronts. The *princeps* of the legion was *primipil*, and commanded the four *centuries* of the first half of the first cohort; the second princeps of the first cohort commanded two centuries of the second half of that cohort. The first and second hastati had each 150 men of the second half of the first cohort, and the first triarius commanded the fifth century of the first half of the first cohort. The centuries had, besides this, particular *centurions*; and there were *decurions* over every ten men (*contubernium*).

Under Trajan the order of battle was again altered, and assumed the disposition shown in *pl. 4, fig. 38*, which represents the order of battle of Arrian against the Alani. The archers stood upon two hills on the flanks, and shot over the heads of the heavy armed cohorts in front of them. The legion stood eight files deep, in close order, *i. e.* three feet to a file; in the four first ranks, *a a*, were those who were armed with light lances; in the four others, *b b*, those armed with long lances. Afterwards a ninth rank, *c c*, was added, consisting of Nomadian, Cyrenean, and other archers; whereupon, after the commencement of the action, the first-named archers also united in a rank, *d d*, in rear of all, in order to shoot over the heads of the legion. The station for the war-machines is in the line *e e*, behind the united order of battle; and the cavalry collected in eight masses, four of which were stationed at *f f*, in rear of the archers, and the others on the two flanks. Were the foe routed, the legion opened and permitted the cavalry, *f f*, to pass through in pursuit.

Castrametation also is a part of tactics, and *pl. 13, fig. 1*, represents a great Roman camp according to Polybius. The Roman camp had the form of a square, and so soon as the place of encampment was designated, a standard was set up at the best and most open spot, and on each of the four sides of this a line of 100 feet was staked off. The square so formed, *A*, was the *prætorium*, and contained the prætor's tent. In front of this, and on the side most convenient to water and forage, the *legions* were

encamped. As now each legion had six tribunes, and each consul commanded two legions, there were twelve tribunes under each; the tents of the *tribunes* were set up in one line DD, parallel with the front of the *prætorium* and occupying each 50 feet of front, their openings towards the legion; the intervals were so arranged that the breadth of the tribunes' encampment was equal to the front of the legion's; 100 feet in front of and parallel to this line of tents began the camp of the legions; the street thus formed was called the main street. The line of the front side of the tribunes' tents we call the front line. Perpendicular to the front line in the centre a street of 50 feet wide was laid off, on each side of which, at MM, the legion cavalry were encamped. To each *turma* was allowed a space 100 feet square, and between the ten *turmæ* a second street of 50 feet in width, the *quintana* T, parallel to the main street, ran across the entire camp. Behind the cavalry, at OO, the *triarii* were encamped, having a space 100 feet broad and 50 feet deep; then came on each side a street, and at PP the camping ground of the *principes* 100 feet square; then that of the *hastati*, QQ, of the same size; then a street again on each side, and next this, at RR, the camp of the allied cavalry, 100 feet long and $133\frac{1}{2}$ feet deep, and behind these, at SS, the allied infantry were encamped having 100 feet of breadth and 200 of depth. Thus is the breadth of the whole encampment determined at 1617 feet. At the upper part of the camp, next the *prætorium*, was on each side a market-place, upon which, at C, stood the tents of the two *legates*, and at B the *quæstorium*. At N also the market was sometimes established. The leaders of the confederates found place at EE. The élite and the veteran troops had the honor of a separate encampment in the vicinity of the *prætorium* apart from the rest of the legion: the cavalry of the élite at G, their infantry at J; the cavalry of the veterans at F, and their infantry at H. The troops of the reserve were placed above the *prætorium*, their cavalry at K, their infantry at L. Entirely around the whole encampment ran the camp street, AA, of 200 feet in width, and then came the entrenchment, in front of which was a ditch to secure the camp from a sudden assault. The camp had four gates, of which that opposite the front of the *prætorium*, the *porta prætoriana*, Xa, was for the prætors; the one on the opposite side from this, the *porta decumana*, Xb, for the chief officers; while that on the left, Xc, the *porta principalis sinistra*, and on the right, Xd, the *porta principalis dextra*, were for the imperator.

According to Polybius the Romans used two principal orders of marches: the forward march (*pl.* 4, *fig.* 39), and the flank march (*fig.* 40). The forward march was always in one column, because battle was given usually only near the encampment, so that the marching out was from only one point. First came the cavalry (*pl.* 4, *fig.* 39 A), then the legions in succession ready for battle with their baggage B, and in the rear again cavalry C, closing the march. If an attack was expected on the route, then the baggage was transferred to the rear of the column in front of the closing cavalry, to which in that case an infantry legion was united. The front of the column was, at the time of the manipular disposition, only one

maniple ; in the disposition by cohorts, one cohort. The second order of march (*fig. 40*) was the flank march. The legion formed in the *quincunx* order ; the velites at A (the unshaded squares in our figure) ; the hastati at B, the principes at C, and the triarii at D, took the baggage in the centre, in the intervals of the lines B, C, D, while the velites covered the intervals, then faced to the right or left, and marched. Arrived upon the field of battle the legion faced again to the left or right, according to their position, so as to front the enemy, and drew out from the baggage in the direction of the dotted lines in the drawing, at first direct to the front, afterwards bringing forward one or the other shoulder, on to the assigned position, in the *quincunx* order of battle.

When the legion had marched in the order represented by *fig. 39*, and it was desired to assume again the triple order, the following manœuvre was employed. Suppose the march to have been by maniples, as shown in *fig. 41*, then the first maniple of the triarii, as soon as they arrived on the alignment of the triarii, faced to the right and moved to the right flank ; the same with the principes and hastati, and then with the other maniples in succession, as each came upon its proper alignment in the march by column. Then the proper intervals of the *quincunx* order were assumed in these alignments. In the disposition by cohorts the manœuvre shown by *fig. 42* was used. The column of cohorts halted ; the first, second, third, fifth, sixth, eighth, and ninth faced to the right, and took their positions and intervals in order of battle ; while the fourth, seventh, and tenth, so soon as they were uncovered by the others, were by the command " march " moved forward on to their proper alignment. We will give here one other case, that, namely, where the column of route by the first order, attacked in front, must establish itself in order of battle. This manœuvre, which Metellus practised against Jugurtha, by whom he was attacked on the march, is represented in *fig. 43*. The even numbered maniples of the hastati, principes, and triarii marched in the column behind each other. The march had been to the left, and the left flank therefore was in front ; the attack was made on the right. In forming into line of battle, all the maniples of the hastati and principes faced to the right, and moved by a flank until they touched their proper alignment, when they came into line by bringing forward the left shoulder or by a wheel, and assumed their proper intervals. The triarii meanwhile marched straight forward until each maniple reached its position, when they wheeled into line. Finally, we must mention an order of march, namely the *quadrangular*, which Marius assumed when he had victoriously repulsed, though only with the greatest difficulty, the attacks directed by Jugurtha upon various sides of his column of route. He feared a speedy repetition of the attacks, for he knew the Numidian warfare, and resolved to prepare for them. *Pl. 4, fig. 44*, shows the order of march chosen by Marius, and the attack which, in truth, shortly followed from Jugurtha. The Roman general marched with his army in order of battle. The line *bb* was formed by two Roman legions with a front of 24 men reckoned along the line *bc*, a length of 2880 feet ; at the side of these legions marched Sylla with 44 *turmæ* of cavalry, *aa*,

on a length of 2610 feet. To the left, beside the legions, marched Manlius with the slingers, archers, and some cohorts of the allies, *cc*, which to correspond, formed also two legions, or were made up to that complement by the allies. The two lines *bc* and *bc* were formed by the remaining cohorts of the allies which marched with the full front. At the head of the whole order of march was Marius himself, with the third part of the auxiliary cavalry, *dd*. After the march had been continued in this manner for four days, scouts came suddenly from all sides announcing the attack of the Numidians. Sylla was first assailed by the Mauritanian cavalry, *A*; and meanwhile Bocchus with his infantry, *C*, fell upon the rear of the Romans; and Jugurtha with his Numidian cavalry, *B*, kept Marius employed. As soon as Jugurtha had intelligence of the attack of Bocchus, he turned with part of his troops, *A*, upon the legions, and endeavored to spread the report that Marius had fallen; while the Numidian infantry, at *AA*, essayed an attack upon the archers, at *cc*. By these numerous attacks the Romans were shaken certainly, but when Sylla, having put the Mauritanian cavalry to flight, fell upon Bocchus in flank, overthrew him, and then turned upon Jugurtha, whom Marius had also taken in flank, the flight of the Numidians became general, and the victory was won. From this time forward this order of march came much in vogue with the Romans, and the quadrangles of Crassus and Antony are renowned in military history.

An instance in which from a simple order of battle, the quadrangular was formed, is presented by the manœuvre of Julius Cæsar near Ruspina, where he had put himself in march with 30 cohorts and 400 horse to obtain provisions, but at 3000 paces from his camp was attacked by the Numidians under Labienus and the Pacidi. *Pl. 4, fig. 45*, shows this manœuvre. As soon as the foe came on, Cæsar formed his 30 cohorts in a long line *aa*, on whose flanks he posted the cavalry. Directly, however, the hostile cavalry so extended itself as to outflank Cæsar's line on both sides, and in connexion with the infantry, after Cæsar's cavalry was doubled up and thrown back upon his foot, to entirely inclose the whole army in the oblong dotted line, endeavoring to overwhelm them. Cæsar now caused all the even cohorts to make the half-face, and the even and odd alike to draw out 30 paces from the first line of battle, while the two 15th cohorts made a wheel on a fixed centre pivot. The fifteen cohorts on the left then marched to the left, those on the right to the right, and formed a junction, thus making two quadrangles, with which Cæsar broke through the Numidian cavalry, and took a new position at *b* and *b*. The repulsed cavalry formed the extremes of these quadrangles on the right and left flank. After thus forming these quadrangles, which mutually protected each other and divided the Numidian force, Cæsar devised how to unite them both and commence the retreat to his camp. For this, he by degrees drew back both quadrangles upon a new line of battle, and then caused them, approaching each other in *cc*, to unite into a single quadrangle with which he retired to his camp.

The Romans had eight modes of attack, seven of which Vegetius imparts to us. *Fig. 46* shows the first, where the whole army attacks in

line, the infantry in the centre, the *turmæ* of cavalry on the flanks at A A. By the second mode (*fig. 47*), the left wing, with its cavalry A, preserves such a distance from the right wing of the enemy as to be out of reach of his projectiles, while the right wing, with its cavalry A, advances in echelon from the right and strives to drive him back or outflank him. The third method is in all respects like the second, save that the attack is directed against the left wing of the foe. The fourth mode (*fig. 48 a*) was thus: the direct order of battle was maintained until within 150 paces of the enemy; then the centre halted, and both wings advanced rapidly upon the foe to overthrow his flanks. As an example of the fourth and fifth methods, the action at Elinga, between Scipio and Hasdrubal, may be given (*fig. 50*). On the day of the fight, Scipio beat up the advanced posts of the Carthaginians with his cavalry and light troops, while he placed his army in order of battle, thus: the auxiliaries in the centre A, but the Roman legions forming the wings B B, so that they were opposite Hasdrubal's Spanish auxiliaries, who were on the flanks of his direct line of battle C. After the light troops had fought for some time with tolerable success, Scipio caused them to retire through the intervals of the maniples and to take post behind the wings, the light troops in the first line, the cavalry in the second, and he then advanced upon the foe. When the army was yet about a *stadium* (125 paces) distant from the line of the enemy, the centre was ordered to step short, while Scipio with the right wing and J. Silanus with the left advanced in echelon by the centre from the flanks of each wing, upon the two extremities of the hostile line, the cavalry at the same time advancing from the cover of the flanks B B and attacking the cavalry of Hasdrubal D D. Both flanks of Hasdrubal's line were broken, and his army would have been destroyed had not a violent storm of wind and rain forced both armies back to their camps.

The sixth mode of attack is nearly related to the second, yet the explanation of it by Vegetius is so obscure that it permits two different representations. According to the first (*pl. 4, fig. 48 b*) the army advances in the direct order, and at the distance of a stadium (125 paces) from the foe is halted, when the right wing attacks the hostile left in the second method, while the centre and left wing retire in echelon from the right, until the whole army forms an oblique line to the enemy, while the reserve at A forms a square. The explanation which Vegetius adds in this case, however, that the army is brought thereby into the form of an I, has caused the second representation (*fig. 49, right*). By this the whole army advances in column of maniples upon the left flank of the enemy, the cavalry A draws out to the right against the hostile cavalry, and the maniples then face to the left and march until they have formed the echelon A A, when they face again to the front and advance in this oblique formation upon the foe, as shown at B B, in order thus to roll him up.

The seventh mode of attack is either of the preceding modes when one flank is supported upon a fixed point, as a hill, a river, or the like. An eighth mode was that which determined the battle of Cannæ, where Hannibal attacked with the centre and threw back his flanks. The Romans had

strengthened their army to eight legions of 5000 foot and 300 horse each, which under Æmilius Paulus and Terentius Varro stood at Cannæ opposed to Hannibal, who supported his camp, and the left flank of his line of battle on the river Aufidus, and divided their army into two camps. On the day when Varro had the command, he gave the signal for combat, and the Roman army took such an order of battle that on the left wing at *A* was the allied cavalry *kk*, and beside them the allied infantry under Varro. The disposition of the right wing, under Æmilius, was similar, the cavalry being at *ii*; the proconsuls Marcus and Cneius formed the centre. The army was disposed in four lines, the triarii at *ad*, the principes at *be*, and the hastati at *cf*, while the light armed and slingers formed the advanced line *gh*. The maniples of the triarii were largely strengthened, and the whole army, with the auxiliaries, numbered 80,000 foot and nearly 6000 horse. Hannibal posted his Balearic slingers and other light troops in the line *qq* before his army; on the river he posted the Iberian and Gallic cavalry *pm* and *mm*, opposite the Romans; next these the Iberian, Gallic, and other infantry *ll*; then came the Libyan, and finally the Numidian cavalry at *nnu*. The Gauls and Iberians were intermingled by maniples, first a troop of Gauls, then a troop of Iberians. Hasdrubal led the left wing, Hanno the right, and Hannibal the centre. To the attack Hannibal advanced the eighth central *syntagma* of Gauls and Iberians, and supported them by twenty-four syntagmata on each side, advanced in echelon by three divisions, so that the whole line of battle was curved forward at the centre. The light troops now made as usual the first attack, in which fortune was doubtful, but then commenced the charge of cavalry, which, as the masses on both sides were hemmed in by the river and by the infantry so that they could not extend, was terrible, and terminated in the total destruction of the Romans at this point. Now the light troops retired and the main battle engaged; here the Romans were at first victors and drove back the advanced syntagmata of Hannibal, but as these retained their perfect order, the salient curve at *o* became at last re-entering, forming a concave into which the Romans pressed with a boar's-head (see *pl. 13, fig. 4*), which Hannibal inclosed with a hollow wedge and oppressed, while Hasdrubal, who had beaten and put to flight the Roman cavalry, charged it in the rear. Meanwhile Æmilius had fallen, the Romans had lost courage, and as now Hanno returned from pursuit, the victory of Hannibal was decided, and the greater part of the Roman army destroyed.

Under the Emperor Augustus and his successors a standing army was introduced, and the whole system of war changed.

B. WARFARE OF THE MIDDLE AGES.

The continual wars of the Romans with the nations dwelling north from them, and their conquests in all the other parts of Europe, had served to civilize the people with whom they came in contact, and thus, when the

monstrous Roman empire, from the weakness of its rulers and of its institutions, fell to pieces, the other nations of Europe had already received the seeds of a culture which developed itself with giant strides so soon as they established themselves in fixed settlements and became habituated to permanent residences. Thus far we have had to mention the other nations of Europe only as they waged war with the Romans, or as allies aided them in their warfare; from this time forth we have to consider these nations as possessing each a peculiar military system of its own, which was soon destined to hold the Roman in check, and to experience in itself the effects of that continual elevation in culture of which it was itself the cause. We must follow, through a succession of centuries, the principal stages in the formation of the Italian and German military systems, in order to deduce from the same our present science of war, in its incontestably highly perfected condition.

With the permanent establishment of the German people in fixed localities came naturally a change of their internal relations and circumstances. Before, the whole race had a common interest, every free man was born a soldier, and his calling was to fight the enemies of his people. Now, this was all changed, and the question soon arose, whether the war commenced was really a war of race and nation, or if only some one of those who had contrived to attain a certain supremacy, had begun the feud for his own personal objects. In the first case, war service became an undeniable duty, but in the second was merely free choice or the lust of gain. For these national wars arose the *army-bann*, a war service founded upon real property, for discharge of which ownership of the soil was the pay, proof in other words that pay was not needed, or that, by the lien on the soil, it had been received once for all.

This war duty was naturally in the highest degree troublesome, not for the vassals alone, but the leader received thereby great numbers of people utterly unfit for real service, so that the necessity arose for having, besides the army proper, a number of men trained to war, who should not only be ready themselves in all cases, but be fitted to instruct and discipline the army-bann if called out. At all times the exactor of war service cared less for the person by whom it was rendered than for the actual performance of the duty; and thus it soon became the custom to accept a substitute, or an equivalent in money, with which an agreement was then made with some war-loving leaders for the enlistment of whole parties. In later times, free men who found themselves in destitute circumstances, or were in some manner oppressed, entered into a kind of vassalage with the powerful, and gave up their freedom, and even a portion of property, for the sake of protection and to be freed for ever from war service. Others engaged themselves, in consideration of various privileges and advantages, and became feudatories. Thus many free men elevated themselves so much above their fellows, that they became masters and formed an especial class of their own, the war nobility. But even among these war nobles no equality reigned, for here also was a higher class, upon whom the lower were to a certain degree dependent, and thus arose the feudal system, in

which the holding of a fee imposed the duty of war service on the lord, just as formerly the possession of real estate had imposed the army-bann service. As, however, the number of feuds diminished with their increased extent, so the number of soldiers became naturally smaller, and instead of foot the greater proportion were horsemen or knights. The fee service was now the principal, and the war of the empire affected the vassal only mediately, through his liege lord. The general obligation to service remained properly the same, but much modified, according as the subject was a liege-lord, or possessed a freehold, a feehold, a sockage, or no estate at all, according as he was mediately or immediately dependent on the empire; and even here all sorts of modifications were introduced by contract and relation. The feudal system had the effect withal of removing the mass of the people from war service and creating a warrior class. The number of soldiers, however, was small, the duration of service short, and thus wars could not become either national struggles or wars of conquest, but were confined really to short feuds. The feudatories must, in general, serve the empire six weeks at their own cost, or, on the coronation processions of the newly-appointed kings to Rome, until he was crowned by the pope. Many sought to free themselves from this service, and sent substitutes, or money to procure such. Thus arose the paid service.

All mercenaries were taken merely for the time of actual war, and disbanded so soon as that was ended; in the Byzantine kingdom alone do we find traces of a standing army. With respect to the maintenance of the troops, in the times preceding the reign of the Emperor Maximilian, all accurate information is wanting. When a somewhat regular allowance found place, one and a half pounds of bread, a portion of wine, and meat three times a week, were given, besides cheese, beans, and other pulse, alternately.

In the earliest times, the commander-in-chief was chosen in the field by the elders of the people, in free election; and after the choice had been announced to and accepted by him, he was clad in all the insignia of his rank, and elevated upon a shield in the presence of the people, whose weal he was to defend, and of the army, whose chief he was to be (*pl. 14, fig. 2*). Afterwards, when, instead of the army-bann, the host was composed of lords with their vassals, the feudal superior was commander-in-chief, and his vassals, the great feudatories, became his subordinates and council of war; the officers, if we may admit such a position here, were chosen by each subordinate for himself; and there were, of course, as many of them as there were separate followings among the vassalage of each, so that no such thing as a regular organization of the army was to be thought of. Where there were mercenaries, a captain had the immediate command, and designated those who should command under him. That under such circumstances no particular tactic or art of war was practicable, is evident enough. Of great strategic plans for a whole campaign, of dividing or cutting off, etc., of whole corps, of skilful marches, we find in the military history of the middle ages scarcely any trace. In general the two parties assailed each other hotly; the brevity of the fee-service and

the expense of war, urging them to bring on at once a great battle, by which the issue was usually decided; and this main action itself was mostly a series of single combats, without plan or order, it being of much less consequence that the commander-in-chief should have especial skill in the art of war, than that he should be looked up to with respect by the army, and that each subordinate should obey him willingly and observe his orders.

In the feudatory force, cavalry was predominant; in that furnished by the cities, infantry; until here also equalization was introduced. Sometimes the cavalry fought entirely distinct, usually on the flanks; sometimes dispersed in masses among the infantry, or with single foot-soldiers between the horsemen to support them; or the archers brought on the conflict, which the cavalry then continued. The infantry were usually disposed (as in *fig. 3*) in deep order, and carried long spears, with which they killed the horses, and so put the riders *hors-de-combat*.

Prisoners were, in general, harshly treated; not unfrequently, indeed, put to death. A very common practice was that of decimation (*pl. 14, fig. 1*), which was applied also in case of mutiny in the army. The whole number of condemned were placed in a row, and then every tenth man counted off and immediately executed, while the remainder were permitted to go free, or with only some light punishment.

Ere we proceed to the time when, under the Emperor Maximilian, the German army received, from the renowned Captain George of Frondsberg, a regular organization, we will give some details respecting the arms and military dress of that period.

The most ancient weapons of the Germans, Normans, Anglo-Saxons, and Danes, we have described already in pages 19, 20. The art of the armorer was everywhere diffused in the middle-ages, and stood in high repute; next to peltry, arms were up to the end of the twelfth century the chief article of barter for the wares of India. Among the Goths in Southern France, we find mentioned, in the fifth century, shields inlaid with gold and silver; and the swords of the Vandals were also inlaid with gold. *Pl. 15, fig. 63*, shows a dagger which Duke Rudolph of Swabia wore, when, in 1080, he fought at Merseburg, against King Henry IV., which belongs, therefore, to the last half of the eleventh century, if not still earlier. This dagger, the richly decorated gold hilt of which displays a skill in carving remarkable for that age, gives evidence also of the perfection of the armorer's art at that period. In the thirteenth and fourteenth centuries, however, this art attained in Germany, but especially in Northern Italy, a very high degree of excellence; and we have admirable suits of armor of that age, in which the inlaid work is principally arabesque and leaf-work, or escutcheons. Here also we will follow the division of weapons into those of offence and defence, and describe them as they are represented in plates 15 and 16.

The bow proper (*pl. 15, figs. 1 and 2*) held its repute longest among the Scandinavians and Normans; in Germany it was almost entirely superseded, as early as the twelfth century, by the crossbow, which the old *balista* suggested.

The Genoese were the first who constructed the balista, known in anti-

quity on so small a scale that it could be handled by one man. Richard I. introduced it into England, and in the third crusade it was already a common weapon. The crossbow represented in our plate (*fig. 3*) shows the earliest form of this arm; the wooden stock is three feet three inches long, one and three-quarter inches broad in the widest place, and five and three-quarter inches thick in the thickest. The bow is of steel, two feet long, and in the broadest part nearly four inches wide; the whole weapon weighs fifteen pounds. The string was usually double, made of gut, twisted and wound with silk or thread; each man had two such strings. At the upper end of the stock was a piece of curved iron, in which the bolt or arrow was laid, and then held behind by a catch. For taking aim, there was a small back-sight, which was brought in a line with the notch on the arrow. When the bow was bent, the string was held back by a claw, which, being pushed up by the trigger, let the string fly in firing. Afterwards, a particular kind of lock, similar to our musket-locks, was contrived, to make the discharge easier. The crossbow was bent by means of a windlass which each man carried with him, and which was constructed in various ways. Sometimes it consisted merely of several wheels, sometimes of a kind of pulley; frequently it was merely a double lever. At first, only arrows like those shot from the bow proper (*pl. 15, figs. 4, 5, 6*) were shot from the crossbow, but afterwards, when the steel bow had been still more strengthened, heavy bolts (*fig. 13*); and the effect was so powerful, that even at considerable distances such bolts penetrated light cuirasses, shields, and helmets, and completely transfixed the unarmed. The arrows were feathered at the upper end, for greater steadiness of flight, as the figures show; frequently they, as well as the bolts, were split, and a strip of leather or parchment inserted. The heads of the arrows were of various forms (*figs. 7, 8, 9, 10, 11, and 12*). They are found single, double, and triple-pointed, provided usually with one, often with two and three pairs of sharpened barbs. Sometimes, when objects were to be set on fire, a ball of pitch, tow, and other combustibles, was fastened close behind the head (*fig. 6*), and lighted just as the arrow was discharged. Such fire-arrows, carrying the Greek-fire, were very much used. For the crossbow heavy bolts were used (*fig. 13*), pointed also often with several points, and formidable even from their weight alone.

The dress of the crossbow-man consisted usually of a cuirass, which was woven of wire, and hung low enough to cover the legs. The head was protected by a close-fitting cap of tin plate, which passed afterwards into the form of a kind of helmet. The poorer archers wore only a breastplate or leather jerkin, set here and there with pieces of tin plate. In such cases the archers were protected by shield-formed wicker hurdles, of the height of a man, which were carried by men appointed for the purpose, and set up in the ground before them. A short sword or battle-axe also was usually carried by the archers.

The spear or lance was the most ancient weapon of the Germans, and this arm has been maintained in honor. From the formation of the feudal nobility, the lance was the chief weapon of the knightly equipment. The staff of this knightly lance, which differed widely from the common spear,

and was much heavier, was of oak, fir, linden, sycamore, or ash wood, often carved and richly decorated; and where it was clamped under the arm, was hollowed out (*pl.* 15, *fig.* 48). The head for war use was rather strong and heavy than sharp; sometimes twelve to fourteen inches long and eight inches broad. Below the head was fastened a pennon, partly as insignia, partly to frighten the enemy's horse. In later times, the knight-banneret bore his banner on the lance. Over the hollow for the arm an iron guard was sometimes fastened, and a funnel-shaped cap of tin plate, which, when the lance was laid in rest, protected the breast and arm. At tournaments and tiltings the lances had no heads, but only, as in *fig.* 48, a kind of knob with three short points, serving merely to prevent the lance from slipping when it struck the mail plate.

Besides the knightly lance, however, we must mention the spear or pike, the main weapon of the footman; from which, too, the hunting-spear (*fig.* 19) must be distinguished, the head of which was leaf-shaped and ornamented, and decorated usually with a pair of woollen tassels. The war-spear had a long and not too heavy shaft of tough wood, and a head which was heavy, and of the most various forms. In the earliest times, only a simple head was used, or at most a barb was added; but in the later middle ages the most various, and often the strangest forms made their appearance (*figs.* 20–47). At first a hook only was added to the head, which could be fixed in the meshes of the hauberk, and the foe thus pulled down; but afterwards the spear was so contrived as to afford a double weapon. The spear had often two, three, or even more points, as *figs.* 31, 35, 43–47, of which some were thrust forward by pressure of a spring. There were lances of which the head part was two or three feet long. Often, too, an axe, or other weapon, was united with the spear. Such an arm was called a *bisarm* or *gisarm*, and consisted of a point, with a curved blade for striking (*figs.* 20, 21, 23–28 and 47), or of one straightforward point, and several others projecting at the sides (*figs.* 24, 30, 31, 32, 42, 45). As the knightly lance disappeared, the spear also passed, in the fourteenth century, into the partisan and halberd, and the officers of infantry carried these even to modern times. The shaft of the partisan (*pl.* 15, *figs.* 32, 49, and 50, *a b*) was six to eight feet long, shod with iron; the head consisted of a broad two-edged blade, dagger-shaped, beneath which was a crescent-shaped axe for striking, and on the opposite side a point or hook.

A weapon of great importance in the middle ages was the sword, the form of which had changed very little among the Germans since the earliest times. The sword was then, that is to say the state sword, very short and very broad, with a very short hilt. There belong, for example, the sword of Childerick (see Division III., History, *pl.* 22, *fig.* 33), and Charles the Great's sword (*pl.* 15, *fig.* 59), the lower end of which is here wanting. The later forms of the knight's sword are shown in *figs.* 51, 52, 53, and 56. The hilt was very long, because, in consequence of the great weight of these swords, it was necessary to use both hands in wielding them; and the pommel very heavy, not, however, to serve as a counterbalance to the blade, for it was rather desired to make the sword heaviest at the point for the

greater momentum (*fig. 56*), but for beauty's sake only, and to afford a firmer hold. The cross-shaped guard, often richly and tastefully adorned, served at once for protection and for ornament. The blade was either rounded at the point or cut off in a very obtuse angle, and was at the same time very long; thus, for example, the blade of the sword (*fig. 56*) which was worn by John George I. of Saxony is 5 feet long, and of that (*fig. 57*) which Henry the Pious once bore, 6 feet. In old accounts swords of even 11 feet in length are spoken of, but these were only carried in processions. Besides the great German sword, the French had some, somewhat smaller indeed, but ending in a sharp point, so as to be used for thrusting. Such swords "*à l'estoc*," which the Germans called rapiers (*panzerstecher*), are shown in *figs. 58* and *62*; strictly speaking, *fig. 51* belongs here also. In the fifteenth century we find swords whose edge is straight on one side but waved on the other, or with the whole blade flame-shaped (*figs. 54* and *55*). The same were used very seldom except by the Swiss, or on occasions of ceremony. In addition to the great sword the knights often carried a small one at the saddle-bow.

From the Saracens the Germans got the sword with a curved blade, endeavoring to adapt the sickle-formed edge of the Turkish scymetar to the straight blade of the German sword. *Fig. 60 a* gives such a sickle-shaped sword, having its edge on the side where the back would be in a common sword, so that with these scymetars the wielder did not strike forward but drew them towards him as in reaping. A rather clumsy weapon of this kind the Bohemians used in the Hussite wars, and called it *dusseg* or *dussac* (*pl. 15, fig. 60 b*); it seems, however, to come nearer a crooked dagger.

The sword was carried at the left side in a belt, yet we find also the old Normans carrying it on the right side without a belt, attached by two studs to the cuirass. On the blade, upon which was often an inscription, and on the hilt of the sword great expense was bestowed (*figs. 51* and *58*.) *Fig. 58* is the so-called electoral sword from the armory at Dresden; the hilt is of silver chased with gold. Still later the old sword-form passed into the rapier-form (*fig. 61*), and the blade became shorter than before. Along with the sword was also used the dagger, which hung at the right side to a chain, or by a separate stud on the cuirass. Not until later did the blade of the dagger become short, three-edged, and pointed, as in *fig. 63*. We have spoken of this dagger already, and have only to remark here that the hilt is of ivory and the blade gilded. An uncommon form of dagger, used by the Bohemians, is the sickle (*fig. 64*). The dagger was used for quicker defence at arm's length and in single combats, when the combatants were overthrown, to continue the fight; often also to give the fallen enemy a death-thrust in the throat or back, whence in old chronicles we find the dagger called also "*misericorde*" (mercy). The Normans, who wore the sword on the right side, carried the dagger on the left. The ancient Saxons had also a dagger-like weapon, which was called *sahs* or *sax*, and from which some derive the name of Sassens or Saxons.

Other kinds of offensive weapons are the *battle-axe*, *mace* (*morgenstern*),

&c. The earliest battle-axes, for they go back to times when the use of iron was unknown, were generally of flint, sharpened either by striking, or by grinding in some way not now understood, and with a hole worked out for the handle. *Figs. 14–18* are such stone battle-axes. Later the stone was exchanged for iron; and a mallet, which was also hurled, was added to the weapons. In the 13th century this weapon had already become smaller (*fig. 69*, left side), and was used by the knights, being carried at the saddle-bow or in the belt. Nearly equal to the mallet was the battle-axe, which, at the time of the migrations, had become a common weapon among the Germans, as we have before mentioned in treating of the warfare of antiquity (page 20). Later it was used principally by the Danes, wherefore it was called also the Danish axe (*pl. 15, fig. 65*.) To give the blow more momentum the handle was often of iron; *fig. 66* shows such an axe, which has also several points. An elegant weapon of this kind is the battle-axe of the Elector John George I. of Saxony (*fig. 67*), upon the iron handle of which the idolatry of the Jews is represented in half-relief. The handle was hollow, and formed the sheath for the fine dagger-blade shown in our engraving, which was itself ornamented with etchings.

To the death clubs belongs the pointed flail (*fig. 69*, right hand), which was carried chiefly in the Hussite and peasant wars; the Swiss also used it at Morgarten and Murten, as *fig. 70* shows. But at that time the *morgenstern* had become the more common weapon, stout wooden or iron clubs, set all over with prickles or hooks, which appear also in the 10th and 11th centuries. The *morgenstern*, represented in *fig. 71*, is found in the armory at Dresden, and is of wood, with iron points, &c. Another kind of *morgenstern* are the clubs (*fig. 68*), which are small, all of iron, very short, and instead of hooks are set with sharpened knife-corners. These clubs (maces) the knights carried alike in the tournament and the field.

To the earliest of defensive arms belongs the shield; of its most ancient form and material we have spoken already. Among the Anglo-Saxons the shield was oval, of wood, bound with an iron rim, and with an iron point (boss) in the centre; the Franks had it three-cornered, broad above, sharp below, and this continued to be the general form in the middle ages, although now and then it was made more ornamental by indentations in the rim, &c. This shield was also of wood, plated with hammered iron, and when not in use hung by a band over the right shoulder and on the back. Frequently the shield was furnished with strong iron spikes, so that it might be serviceable also for a blow (*fig. 77*). Such shields were permitted even in the ordeal by combat, but the points must not be more than one foot in length. The infantry had a larger shield (*fig. 72*) of wood, painted usually with the arms of the liege lord and knight, and bound with an iron rim. To protect the archers the shield was yet larger and curved (*fig. 73*), in other respects as above described. They ceased to be used in the 15th century; among the Bohemians alone are they found as late as the 16th. Round shields also are frequent, at the time of the crusades especially, when they were adopted from the Saracens. They are usually flat-vaulted and very large (*fig. 74*),

sometimes, however, very small for knights (*fig. 76*), with a boss and without; of wood plated with iron, often entirely of hammered steel; adorned very frequently with tasteful ornaments, inlaid with gold and silver, or gilded. In state processions they were often entirely of silver or even of gold. One particular kind of Saracenic shield (*fig. 75*) was high-vaulted and had a boss, but this is seldom seen. The shield was frequently stuffed; always, however, lined with cloth or velvet, and sometimes fringed (*figs. 72, 75, and 76*).

Next to the shield the helmet is the oldest defensive arm. It was made of hammered and also of cast iron. The cap, which is the oldest form of the helmet, received afterwards a projection which extended over the nose, but left the eyes and cheeks free. Such helmets appear in the 10th and 11th centuries. The first visor we find in the year 1155, and at the time of the third crusade they had become common. The first visors were immovable, and consisted of cross-bars riveted to the helmet. From the middle of the 13th century the helmet was rounded above, and in the 14th and 15th centuries forms as in *pl. 16, figs. 1, 2, and 3*, are general. To the upper helm iron plates were added to protect the throat and back of the neck; the visor, however, was very differently shaped and contrived to raise and lower. It consisted either of several small iron bars (*fig. 3*), or of plates with openings opposite the eyes and mouth only (*fig. 2*), or of plates cut or pierced like a grate or sieve (*fig. 1*). Besides these knights' helmets, however, the simple, close-fitting head-piece, pot, or skull-cap remained in use for the attendants, grooms, footmen, and men-at-arms (*figs. 4-7*). Even the knights when not expecting immediate combat, yet wishing to be protected, wore such, but of much more elegant forms. *Pl. 17, figs. 1-4*, and *pl. 18, figs. 4, 8, 9, 10, and 11*, give various examples of knights' helmets. As to the decorations of the helmet and the material of which it was made, we find it sometimes of iron and sometimes of steel, or even, for state occasions, of gold and silver. The steel ones were either painted entirely black, or the steel was blued and variously ornamented, engraved, inlaid with gold and silver, striped and studded, or even set with precious stones. Kings wore crowns upon their helmets; counts and barons also often wore the coronets of pearl belonging to their rank upon their helms. In the 13th and 14th centuries horse-tails were worn on the helmet-crest, afterwards plumes of feathers took the place of them. In later years, when heraldic bearings became common, symbols proper to the bearing were often placed upon the helm, as animals, horns, wings, human figures, &c. These decorations became general in the 15th century.

The Germans and their kindred nations received mail-harness from the Romans, whose cuirass in the latter ages had a form widely differing from that first given to it, for the horsemen were completely covered with iron. The different members were so protected, by means of stout, scale-shaped plates of iron, lapped one over another at the edges, that they retained the power of motion. The helmet closed around the face, so that projectiles could penetrate only at those places where openings were left for the eyes and for breathing. Even the horses were equipped in a similar manner;

these horsemen were called *cataphracts*. The oldest form of the cuirass is represented in *pl. 16, fig. 8*, where the scales are secured upon a leathern under-coat. This harness, from the Dresden armory, is said to have belonged to King John Sobiesky of Poland. The form of the helmet is likewise the very oldest of all, that of a round cap fitting over the head-piece of the cuirass, by which the cheeks were protected. The feather-plumes and Maltese cross are doubtless additions of a later time; the feathers, indeed, were most probably added only to give the harness a better appearance when it was set up. In the 10th and 11th centuries the ring-cuirass (*hauberk, fig. 16*) became common. It consisted of iron rings linked one in another, which were fastened upon a leathern under-coat; among the Normans such cuirasses appear very frequently. At first these hauberks came only to the hips, afterwards they covered the thighs to the knee, where they were met by a similar covering for the leg; according, indeed, to representations in the Bayeux tapestry, there were such mail-suits of a single piece, which were drawn on from below. In the oldest harness of this description the rings were only laid close together, but not inter-linked. Upon old monuments we find also woven mail, one, for example, of the year 1100, where the whole looks like basket-work, whence it has been concluded that this mail was braided with strips of leather; yet it might as easily and much more probably be small iron wire sewed upon leather in the horizontal and vertical position alternately. Underneath the cuirass was a quilted woollen jerkin reaching to the knee. The horses also were provided with such ring and scale mail, and carried on the head a plate of iron with a spike projecting from it in front (*charfron*). The ring and scale mail was gradually displaced by that composed of plates, in which the upper arm, for instance, was covered with a single plate, and the divisions were only at the joints, where still other plates were fitted over these divisions, so as to give the power of motion. At first the upper part of the body was clad in the ring or scale mail, and only the lower part covered with the plate, as shown by the corresponding parts of a knight's harness in *pl. 16, figs. 16 and 17*. By the end of the 15th century, however, the plate or iron band armor had become general, although light ring-cuirasses were still worn under the plate harness in the 16th century (*figs. 9, 10, and 12*). At the same time with their riders, the horses also were provided with mail, which on the head, breast, and hind-quarters consisted of plates, but on the neck of iron bands (*fig. 23*); frequently, however, the croup and hind-quarters were protected against cuts by separate bands only (*pl. 18, fig. 2*).

Pl. 16, figs. 9, 10, and 11, show mail composed chiefly of iron bands such as was used in and after the fifteenth century, the armor represented being that of the Elector Joachim II., of Brandenburg. *Figs. 12, 13, 14, and 15*, belong to this kind also. The complete plate-mail arrangement, however, appears in *pl. 23*, representing the state equipment of Christian I., Elector of Saxony, which is to be found in the Dresden armory. It is of polished steel, and richly inlaid with gold. Here, too, belongs the suit of armor of the Emperor Charles V. (*pl. 17, fig. 1*), of the Elector John the Steadfast of

Saxony (*fig. 2*), and of the knight (*figs. 3 and 4*). When the breast-plate was made of a single piece, it became necessary to have a support for the lance when placed in rest, and for this purpose a hook was fixed on the right breast (*pl. 16, figs. 9 and 10*), or sometimes a short horizontal iron bar, with a curve.

In the armor, especially of later times, great magnificence was displayed. It is found painted black or red, with gold or silver nails and edges; of blued steel, with gold and silver borders and leaf-work (*fig. 9*); bright polished, with graven or inlaid ornaments, and even adorned with precious stones. Armor of silver entirely, or gilt all over, is frequently mentioned. Where the parts of the armor came in contact with each other, they were lined with leather and colored cloth (*figs. 14 and 15*). The separate pieces were fastened together by straps or hooks (*figs. 12, 13, 14, and 15*), and in the same way the greaves, which covered only the fore part of the thigh, the shin-bone, and the knee, were buckled over the hose (*figs. 13 and 17*). Of especial interest are the ring-shaped pieces which protect the elbow and joint of the arms (*figs. 9, 12, 13, 14, and 15*).

Particular attention was given to the gauntlets also, as they were to protect the hand and wrist, and yet in no respect interfere with their free motion. The gauntlet proper, therefore, consisted of thick leather only, but all parts which were anywhere exposed to a blow, were protected by larger or smaller strips of iron and steel-plate, sewed on with wire (*pl. 16, figs. 18-22*). The gauntlets were often engraved or inlaid on the cuffs, and the separate strips ornamented with gilt or silvered edges and studs.

Spurs are a German invention, for the name (*sporen*) has passed into foreign languages from the German. At first, the spur had but one point; later, since the fourteenth century, this has been supplied by a pointed rowel. The fork which held the wheel was at first straight (*pl. 9, fig. 64*), afterwards curved (*fig. 63*). The oldest spurs were very broad, often richly adorned; the rowels had points of an inch and more in length. The golden spur was the mark of a knight; and a nobleman who was not a knight could wear only silver or steel spurs.

The oldest nations rode their horses only on the bare back, yet even among the Visigoths saddles are mentioned. Among the Anglo-Saxons the saddle was only a cushion, with a small seat (*figs. 47 and 48*). In the eleventh century, the front and rear projections were already considerably higher, as was requisite for the mode of fighting practised by the heavy armed. This is shown by the Norman saddle of the year 1120 (*fig. 49*). How the form of the saddle afterwards changed is shown in *figs. 50-56*. *Fig. 50* shows a saddle of the middle, *fig. 51* one of the end of the twelfth century; *fig. 52* one of the thirteenth. To the end of the fourteenth century belong the saddles in *figs. 54 and 55*; in the commencement of the fifteenth, the form was as in *fig. 53*, and at the close of the same as in *fig. 56*. *Fig. 60* is a German saddle of the beginning, *fig. 61* of the middle of the sixteenth century, and *fig. 62* is of the middle of the seventeenth. A state saddle of the fifteenth or sixteenth century is represented in *figs. 57, 58, and 59*; *fig. 58* is the front, *fig. 59* the rear view. Both saddle-pads are wrought

in iron ; the figures and edges gilded ; housings and cover are of black velvet, richly embroidered with gold ; the stirrups of gilded iron.

The warrior garb of the middle ages had transformed itself, in the course of centuries, from the severe simplicity of the old Germans, until, in the time of the Emperor Maximilian, it reached the extreme of pomp and costliness. Broadcloth, silk, and velvet, were the stuffs from which the garments, often with a superfluity of material, were made ; costly embroideries in silk, silver, gold, and pearls, adorned the surcoats at jousts, tournaments, and processions ; and the barrett-cap, which it was then the wont to substitute for the helmet, the last being carried by a page in the rear, flaunted with rich plumes of all colors. The helmet, too, which had sometimes a cover of its own, the helm-case of the same color with that in the escutcheon, bore also, where no particular crest was taken for it from the arms, the richest plumes. The squires and pages likewise were clad usually in the colors of their knight, while the men-at-arms were equipped according to their means and taste. A surcoat, usually richly embroidered, was generally worn by the knights over the cuirass ; it reached half way to the knee, had short sleeves, and was sometimes open at the breast to show the breast-plate.

Pl. 17, figs. 5 and 6, are two groups of foot-soldiers, from the triumphal processions of the Emperor Maximilian, after Albrecht Durer's wood-cuts ; *figs. 3 and 4*, two groups of knights on foot, completely armed, and wearing the above-mentioned surcoats. In *pl. 18, figs. 7, 8, 9, and 10*, are four groups of ensign and standard bearers, of different cities and districts of the German empire, on richly adorned horses. It is seen here how the horses, when not equipped for battle, were covered with rich housings. At tournaments, also, such housings were general, and they were then arranged according to the color of the escutcheons, or they held devices and various figures (*figs. 8 and 10*), or else rich embroidery, as *fig. 4*. Upon the banners and standards the arms of the cities or districts, or sometimes only devices and mottoes, were embroidered. Among the standards represented here are those of Steiermark and the two Austrias (*fig. 10*), of Frioul, Andechsum, and Tockenburg (*fig. 9*), of Kirchberg, Ravenstein, and Waldhausen (*fig. 8*), and of Saalgaw, Bregenz, and Fischbach (*fig. 7*), bearing the arms of the cities and districts. Musicians on horseback we find in *pl. 17, fig. 10*, having cases with them for their instruments.

From the entrance of Charles V. into Bologna, after Lucas Kranach's woodcuts, *figs. 7 and 8* show the Spanish knight with the mallet and the imperial banner-bearer ; *pl. 18, figs. 1 and 2*, the herald of the Golden Fleece and the gold-scattering herald ; *figs. 3, 4, and 5*, the banner bearers of the city of Rome, of the emperor, and of the pope ; *fig. 6*, the banner bearer of Bologna with his suite.

The picture in *fig. 11* may serve us as the conclusion of this period in warfare, presenting, as it does, a lively representation of an army as it appeared at the close of the fifteenth century. The marching forth of an army from its camp is here depicted ; the general-in-chief with the standard, which flutters gaily in the morning breeze, stands upon a rising ground, surrounded by his leaders and attendants, beside the last tents

which yet remain erect, and as the host of knights, squires, and men-at-arms defile before him, kindles them by glowing words to deeds of valor in the coming combat.

In the last decade of the fifteenth century arose that tedious strife between France and Hapsburg. In France the *ban* and *arrière-ban* were no more, the German vassals disowned their homage to the Emperor; but France had formed its "compagnies d'ordonnance," the "hommes d'armes," a paid standing army, from which came forth her Bayard, La Tremouille, La Police; and Maximilian I., the young hero full of "precious thoughts," deserted by the nobility of his hereditary states, must, if he would maintain the dignity of World-ruler, be the founder of a new war system. He created the "good Landsknechts," by assembling the rude burghers and peasants of his Austrian patrimony under his banners, arming them after the Swiss fashion with long spears, halberts, and swords, having them taught to keep rank and file, to wield the lance, and form the "porcupine." Remarkable is it, that in the very year which saw the defence of the German empire pass from the hands of the nobles into those of the peasants, the year 1487, the last tournament of four nations should have been held at Worms. Ludwig von Rheinach, Christoph von Kammer, Otto von Lichtenstein, and Friedrich Kämmerer von Dalberg were the last tourney kings; and after the Countess Palatine had bestowed upon Conrad, knight of Ahelfingen, the prize of victory (*pl.* 17, *fig.* 11), the four tourney kings, with the chief victor and one of the nobles of each of the four nations, had their escutcheons set up for show. Thus ended the German knight-hood.

The constitution of the German soldiery was at this time very free. No conscription or canton service carried the sons of the German boor or burgher to the standard; they went of their own accord, but they demanded even in the imperial camp, securities for their burgher privileges, and these were promised them by the Emperor. So often, therefore, as a ruler needed an army, he gave to some distinguished warrior a commission as general-in-chief, with the license to raise a regiment of Landsknechts, but at the same time the "statute brief" also, that is, the constitution and the usage by which the prince would hold his soldiery. To the term regiment, however, we must not attach the quantitative idea of our own times, but to "raise a regiment" meant then to call an army together under the written constitution, founding as it were a military empire. As soon as the war chief had his brief, and the place of meeting and muster was appointed, he chose his lieutenant and deputy, and as many officers as he had companies to raise. These were then to "beat about," all over the country, for recruits, and persuade creditable and effective fellows to the war game. Admission into the ranks of the "good Landsknechts" stood not open indeed to every land-louper, but the candidate must appear well armed and well clad, and thus only people of some means could follow the recruiting drum. When assembled, an imperial or royal muster-chief made his appearance, with war-counsellors and muster-clerks, and every single man was carefully examined in respect to his person, arms, &c. All the best armed, being

mostly men of long service, were put on the "first roll," and received higher pay, and each company of 400 men must have at least 100 of these; the remainder came on the "second roll," and all received pay from the paymaster. The chief gave his people a stirring speech, had the statute-brief read before them, made them take the oath, and then delivered the standards to the ensigns, admonishing them to lose them only with their lives. Then the different companies came together, the captain cautioned his people, presented to them the lieutenant, clerk, chaplain, and surgeon, whom he had chosen, and now began "in the ring" the choice of sergeants, of sergeants-major, of guides, of commissaries (*Fourier*), and of corporals, by majority of voices; and in this way the regiment, consisting generally of fifteen to sixteen companies of 400 men, was divided and organized from highest to lowest. The colonel had in his regiment the absolute power of life and death. The provost had the rank of captain, preserved order, and in assaults carried a sword himself. The camp followers, consisting of sutlers, laundresses, and various women, the soldier brats and rabble "who followed the drum," were under a special commander.

The administration of justice was severe; at its head stood the mayor (*Schultheiss*), and the sentence was given by a species of jury court, which consisted of twelve judges and the sworn jurors, who were always chosen from the company affected. The sentence was executed as soon as passed. The drill and discipline of these unwieldy landsknecht regiments, which often swelled up from 4,000 to 10,000 men, were suited to the battle-fields of those days. Averse to tactical exercises, the German soldiery of that period knew nothing but to rush upon the foe in open field with levelled lance and halbert, or in close ranks to storm his entrenchments and strong places. Foremost went the "forlorn hope," chosen usually by lot, and commenced the onslaught; close upon them pressed the "storming party," in solid square, at the *pas-de-charge*. The arquebusiers, with their light companies, were in later times attached in separate bodies, as wings, to the flanks of the square or in front and rear. On the outmost sides of the square "the porcupine," those nearest to the foe, the best equipped men, with long spears, swords, and halberts, formed a "front rank" ("*Blatt*"), to which followed the three first companies. The middle space was filled up by four companies less perfectly armed, and all having long spears; in the three rear companies there bristled again a forest of spears, next to a rank of swordsmen; and in the last ranks stood the strongest, best-armed people with long spears, usually the double-pay men. Whenever they were about to engage, the army fell upon their knees, sent forth a hymn and prayer, then shook the dust from their feet, and rushed on with levelled spears. Before the first rank rode or marched the general with his chief officers near him, for not until afterwards did the custom arise of placing, "for the sake of the common good," the officers behind the ranks. In front of the square masses of infantry the single combats of the knights then took place which preceded every action.

Such was the formation, the internal organization, the law usage, and the

custom of war of the first regular European infantry, from which by various modifications the infantry of all modern nations has originated.

As to cavalry, the Emperor Charles created—for until his time only individual knights had fought with the armies—whole regiments after the fashion of the French “*compagnies d’ordonnance*” and “*hommes d’armes*,” which were raised by any distinguished prince of the empire, with the imperial commission. Noble birth was not required. The choice of captains and officers was left to the *field-marshal*, for so the general of cavalry was entitled, to distinguish him from the general of infantry. As soon as the cavalry service ceased to be peculiar to the nobles, a regimental organization very similar to that of the *lands-knechts* was introduced.

It was the Emperor Maximilian who first placed the artillery upon a formidable footing, and created the proper artillery corps in the army; but it was long after ere any degree of mobility was given to it, and this was first effected by the Emperor Charles V. The general of ordnance (*Oberfeldzeugmeister*) had the whole artillery, with all artificers and gunners, under his command; next to him came his lieutenant and the master of ordnance (*Zeugmeister*) and his halberdiers and apprentices (*Jungen*). The gunner (*Büchsenmeister*) had charge of a piece, and must understand laying it by the quadrant. The artificer, armorer, and inspector (*Zeugwart*) had charge of all the materials for a piece; the wagon-master commanded the whole baggage train, and that was not small, for the battering-gun (*Scharfmetze*), which weighed five tons and threw a ball of 100 lbs. weight, required 33 horses, and the ammunition 32 wagons with 163 horses, &c. The harness-master took care of the teams, the powder-master of the ammunition. Finally the pioneer and pontoon train, which the perfected service of the artillery required, were commanded by the trench-master (*Schanzmeister*). Bridge-masters and their people were called hurryers (*Schneller*).

C. WARFARE OF MODERN TIMES.

With the invention of gunpowder commenced a new era in Europe; not in armies and warfare alone, but in the whole civil constitution of society a total transformation was begun, which proceeded not, it is true, with startling violence, yet all the more securely. Although, at first, gunpowder was used only for heavy artillery, of which the largest armies would have but a few pieces, so that, for two hundred years after its invention, its employment was still very rare, and effected no striking change in warfare, or in modes of attack and defence; yet this change was brought about so soon as the weapon was constructed of proportions small enough to be handled by a single man. The first effect was to lighten the whole equipment. The fire-arm threw its shot to great distances, and thus the long lances and swords lost all value, and were both made shorter and lighter. The common means of protection against blow and thrust, the cuirass, shield, and

helmet, were no defence against the fire-arm, unless made very thick, when they became so weighty that they were no longer available for infantry ; whereupon these also were laid aside. By the invention of gunpowder, victory was snatched from the hands of brute force and given to superior intelligence. The art of war, which until now had found its advantage only in superior numbers, or in the great personal strength and fiery courage of the warrior, became a science ; and the most skilful usually carried away the victory from the merely brave. With this advance in the art of war, however, an unremitting practice of the same became requisite, and warfare could be waged only by experienced people, who were familiar with the use of fire-arms, and with the complicated manœuvres necessary to their employment in the field ; even in peace, therefore, it became indispensable to maintain a standing army. To this cause is owing the great number of wars which were waged, either in the cause of religion, as the war of the Reformation, or on political grounds, as the wars of the Revolution and Succession.

That the organization, the armament, and even the support of such armies, were not placed at first on that stage of perfection where they now stand, is natural. The science continually advanced ; each age brought new inventions ; and even fashion asserted here, likewise, when uniformity of clothing was soon introduced, her irresistible power. Hence, we find a constant change in the tactic, continually new and more effective weapons, and even the uniform ever advancing in improvement. The first impulse to the thorough reformations which, in the present century, created as it were a new warfare, was given by Napoleon, whose wars were waged in a manner unheard of until then. In his marches and countermarches, which were rapid as the storm, he needed light troops, and such he knew how to call into existence. As he effected a complete revolution in tactics, so did he also in the clothing and in the armament ; and only our persistence in building upon the foundation laid by this mighty spirit, have we to thank for our present possession of an art and system of warfare approaching very closely to perfection, and capable often of producing the greatest effects with very slight means.

We will now examine more closely the system of war and military organization in some of the more prominent European States, and with respect to the different arms employed, whether infantry, cavalry, artillery, or engineers.

THE PRUSSIAN MILITARY SYSTEM. The Prussian army was first established as a standing army under the Elector Frederick I., who formed, from among the feudal nobles, a body-guard of two hundred men, and placed in the fortresses some companies of *landsknechts*. Two hundred years later, the Elector John William had three companies of guards, of 100 men each, and five companies of infantry, 200 strong, all uniformly clad, at that time unusual. His successor, the great Elector, carried recruiting into foreign states, and his army went up to 30,000 men : among them, 300 artillery. Elector Frederick III., the first king of Prussia, had 36,000 men of disciplined troops, under the command of Prince Leopold I., of Dessau,

and excellently organized. Frederick William I. introduced the rigid military discipline and most of the institutions which still prevail, especially the cantonment service, &c. At his death (1740) the army numbered 76,000 men. Frederick the Great gave his military regulations in 1743, and under him the modern tactic was really introduced. To the cavalry the king gave special attention, and Ziethen was the creator of the Prussian *hussars*, while Seidlitz organized the cavalry tactics. The artillery was newly constituted in 1759, and the organized horse-artillery brigades came forward in 1769, as an entirely new arm. The army consisted at that time of 120,000 infantry, 40,000 cavalry, 10,000 artillery, and 30,000 garrison troops. Under Frederick William II., the army, despite the French revolution, did not increase materially; for, at his death, it contained only 182,000 infantry, 41,000 cavalry, and 12,000 artillery. His successor, Frederick William III., created an entirely new army, after Napoleon, by the Treaty of Tilsit, had limited the Prussian force to 42,000 men. Prince William of Prussia, and Gen. von Scharnhorst, conducted the new organization; foreigners were discharged, and the people became the soldiers, every son of the soil being subject to military service. The cadet establishments were improved, and upper and lower military schools erected. By a rapid exchange of personnel in the small standing army (*Krempfer* system) an immense disciplined force was prepared, and thus, in 1813, a trained army of 150,000 men could be immediately put on foot, which was increased in two months by the *landwehr* (reserve) to 250,000, and from 1813 to 1815, Prussia had one million of men under arms. At present, Prussia's military organization is on the greatest scale, her power resting as much on the troops of the line, as on the completely trained and practised *landwehr*. At present, the Prussian army, exclusive of the "*garde du corps*," is organized into four army-divisions, each of two army-corps, containing each two divisions of two brigades, one of infantry and one of cavalry. Every brigade consists of two regiments and one *landwehr* brigade. In addition to these, each army-corps has one artillery brigade, one pioneer division, one combined reserve-battalion, one light infantry and rifle division of two companies, one reserve *landwehr* battalion, one reserve *landwehr* squadron, two invalid companies, six half-invalid sections, one *army-gendarmerie* command. The field strength of the army-corps is 28,000 infantry, 5,200 cavalry, 5,000 artillery, and 750 pioneers.

The infantry consists of two regiments of the guard, two grenadier regiments, one battalion riflemen of the guard, one light infantry battalion of the guard, and one infantry battalion of instruction (the last assembled only in summer), one combined reserve-battalion of the guard, thirty-two infantry regiments of the line of three battalions (two line and one light battalion), eight reserve infantry regiments of two battalions, four rifle and four light infantry divisions, and eight combined reserve-infantry-battalions. Each battalion has four companies, with 6 officers, 20 non-commissioned officers, 4 musicians, 2 baggage men, and 226 men, and is, therefore, 258 in the aggregate. In peace, only about half of these are under arms. With the staff, the surgeons, the commissariat, musicians, &c., a regiment of the guard contains 3,143, a

line regiment 3,105, a reserve regiment 2,075, aggregate, on the war footing. The light infantry and rifle battalions of the guard have each 1,050, the light infantry and rifle divisions 527 aggregate.

A general of infantry or cavalry (*pl.* 19, upper *fig.* 1.) usually commands the army corps and army division, one lieutenant general the division, one major general the brigade, one colonel the regiment, one lieutenant colonel or major the battalion. The general staff consists of 1 general, 37 staff-officers (*fig.* 2), 15 captains, and 3 lieutenants. Of the adjutants (*fig.* 3), two are assigned to each prince-royal, to each general commanding, to each division, and one to every brigade; the rest of the adjutants are selected from the regiments to which they are attached.

The general's uniform (*fig.* 1) is blue, with red, richly embroidered collar and cuffs, two rows of yellow buttons, and an aiguillette on the right shoulder. The undress uniform has no embroidery; only one row of buttons, and epaulettes with bouillons. Pantaloon grey, with red stripes, and edgings. Black and silver sash, with long tassels. Hat with white and black plumes. The uniform of the general staff (*fig.* 2) is blue, with crimson collar and cuffs, with silver lace (gold for the war ministry), dark blue epaulettes, with silver crescent, buttons white. Hat with white and black plumes. The uniform of the adjutants (*fig.* 3) is dark blue, with green collar and cuffs, with light gold embroidery; yellow buttons, blue epaulettes, with gold crescent. Hat with white and black plumes. The rank of officers generally is distinguished by the epaulette. All wear silver sashes, with long silver and black tassels (the hussars buckled sashes without tassels), silver and black sword-knots, the cavalry with a leather strap. The epaulettes are of cloth, the color according to the army-division (white, red, yellow, or light blue), with silver or gilt crescent bound with black and silver galloon, and lined with red. Staff officers have silver fringe on the epaulette; adjutants general and king's aide-de-camp, silver epaulettes; the lieutenant general, one star; the general of infantry two on epaulette or aiguillette; the field marshal, two embroidered gold bars; the colonel and captain have two small silver stars on the epaulette; the lieutenant colonel and first lieutenant have one; the major and second lieutenant none. Hussar officers have, instead of epaulettes, silver shoulder-knots, twisted for the staff officers, plain for the others, with stars upon them, according to rank. The non-commissioned officers have lace round the collar and cuffs (the bombardiers of artillery only round the cuffs), and black and white woollen sabre-knots (the sergeant-major, troop-sergeant, chief artificer (laboratory sergeant), and ensign, silver).

The color of the infantry uniform is dark blue; of the light infantry and rifle divisions green. The dress, a short frock-coat, reaching nearly to the knee, with one row of buttons and blue standing collar, a red flap on both sides in front, and red cuffs, with a flap, which, as well as the shoulder-strap, varies with the color of the army corps and division. The pantaloons are grey, with red edgings, in summer white. The head-covering is a helmet (*casque*) of leather, plated with brass, terminating above in a point, in which openings are arranged to permit the evaporation from the head to

pass off. On the front of the casque the guard wear the flying eagle; the infantry the escutcheon eagle, with the king's cypher, instead of which the landwehr eagle has the landwehr cross. The guard corps have white or black horse-tails on the helmets, and are distinguished further by white or yellow lace on cuffs and collar. The light infantry of the guard have black; the rifles, red collar and cuffs; the rest of the light infantry and rifles the same, but without lace. The equipment consists of bayonet-muskets, with percussion locks, rifles, and percussion-needle muskets; for the infantry, a short sabre, for the light infantry and rifles, a sword-bayonet, with woollen tassels. The belts are white for the infantry of the line and grenadiers; for the light battalions, rifles, &c., black. The first regiment of the guard has a peculiar uniform for great parades, which originated from the uniform of Frederick the Great's time: *pl.* 9, upper *fig.* 4 shows a non-commissioned officer of this regiment in parade uniform, which is blue, and has red cuffs and collar, with white lace. The cap is white, with red upper part, and silver shield, on which is wrought the star of the guard. *Fig.* 5 is one of the guard riflemen (*Neufchatel*); *fig.* 6, a guard light infantry man; *fig.* 7, a grenadier of the guard, of the Emperor Francis regiment (red shoulder-straps, with yellow); *fig.* 8, a grenadier of the Emperor Alexander's regiment of the guard (white shoulder-straps, with red); *fig.* 9, an officer of infantry; *fig.* 10, sergeant-major of infantry; *fig.* 11, musketeer; *fig.* 12, drummer of infantry; *fig.* 13, officer of light infantry division; *fig.* 14, private of rifle division; *pl.* 20, *fig.* 10, private of the landwehr, in marching equipment.

The cavalry contains one body-guard regiment (*garde du corps*), *pl.* 20, *fig.* 1: white frock-coats, with red trimmings; collar and cuffs, with white lace. Helmet of yellow metal, with white edges, and the silver star of the guard. For parade yellow, at other times white or black cuirass, with breast and back-piece; German saddle, white belts; red caparison, with the guard star and white trimmings. One cuirassier regiment of the guard (*fig.* 2): white frock-coat, with sky-blue trimmings; collar and cuffs, with white lace; helmet same as the body-guard, but, instead of the point, having the Prussian eagle, in silver, standing; caparison sky-blue, with the guard-star, and red and white trimmings; cuirass as the *garde du corps*. Eight cuirassier regiments (*fig.* 5): white frock-coat, with black, crimson, sky-blue, orange, pink, dark blue, yellow, and green trimmings; collar and cuffs; white casques, with yellow plating and points; white cuirass; caparison according to the color of the collar. One guard dragoon regiment: deep blue frock-coat, with crimson collar and cuffs, and yellow lace; white helmet, with yellow plate and point, and the guard-star. Four dragoon regiments (*fig.* 6): same colored frock-coat, with red, black, pink, and white facings; black helmet, with yellow plate and point; Hungarian saddle; white belts; light blue caparison, with trimmings according to color of the collar. One guard hussar regiment: dark blue pelisse and dolman, with yellow lace; hussar cap, with hair plume and wings; buckled sash; red sabretache, with yellow cypher. Twelve hussar regiments, with various colored pelisses and dolmans. The 1st and 2d body regi-

ments (*fig. 3*): black, with white lace; red sabretache, with white cypher, the death's-head on the cap; black caparison, with red and white trimmings; black belts; Hungarian saddle. The 7th regiment: black, with yellow lace. The 4th: brown, with yellow lace. The 3d and 8th (*fig. 8*): dark blue, with yellow and white lace. The 6th, 10th, and 11th: dark green, with white and with yellow lace. The 9th and 12th: light blue, with white and with yellow lace. The 5th (Blücher's) regiment: crimson, with white lace; caparison crimson, with black and white trimmings. Two guard hulan regiments (*fig. 4*): blue jackets (collet), with different colored collars, cuffs, facings, and girdles; deep blue chapkas (caps); white belts, and lance with black and white pennon; white horse-hair plume on the chapka; Hungarian saddle: dark blue caparison, with trimmings the color of the facings. Eight hulan regiments (*fig. 7*): dark blue, with red collars, cuffs, facings, and girdles; deep blue chapka, without plume. The landwehr cavalry (*fig. 9*) have dark blue frock-coat, with colored collar and shoulder straps, and girdle with colored edge; black casques, with yellow plating and point, and lances like the hulans; Hungarian saddle, with dark blue caparison, with trimmings the color of the collar; belts white. The arms of the cavalry are: for the cuirassiers, the long, straight sword, for the remainder, the curved sabre, pistols, and, in addition, carbines for the dragoons, and for the hulans, lances. The fourth subdivision of each squadron has carbines. Each cavalry regiment has four squadrons, with 6 officers, 15 non-commissioned officers, 1 surgeon, 1 farrier, 3 trumpeters, and 127 (in the guard 137) men, so that, including the staff, the regiment numbers 616 (in the guard 636) aggregate, with 570 royal horses.

The Artillery consists of one guard and eight army brigades, and one laboratory division. Each brigade has 3 horse and 12 foot batteries, of which each is manned by one company. There is besides, one company of artificers. Three companies man 12-pounder batteries of six 12-pounder guns and two 10-pounder howitzers each; three horse and five of the foot companies man 6-pounder batteries of six 6-pounder guns, and two 7-pounder howitzers each. Two foot companies man each a howitzer battery, the one of six 10-pounder, the other of eight 7-pounder howitzers. Three foot companies are assigned to the fortress service. In peace, only 20 pieces of the brigade are harnessed, and then the brigade has 1 brigadier, 3 chiefs of sections, 1 staff officer, 15 captains, 16 first and 32 second lieutenants, 192 non-commissioned officers, 240 bombardiers, 35 musicians, 980 cannoniers, 1 regimental surgeon, 16 company surgeons, 6 farriers; aggregate 1524 men, which in time of war is increased to 5000 men and 3600 horses. The uniform is, for the foot artillery, the same as the infantry; for the horse artillery, as for the dragoons, only that the frock-coats are dark blue. Collar flaps and cuffs are black, with red edgings, for the officers velvet, for the guard with yellow lace; edgings and shoulder straps red, buttons yellow. The helmets as for the troops of the line, but the guard and horse artillery have horse-hair plumes. The saddle for the light artillery is Hungarian, for the field artillery, German; caparison dark

blue, with black, red-edged trimmings. The arms, short sabres for the foot artillery; for the light, cavalry sabres and pistols; belts white.

The engineer corps is commanded by a lieutenant general, and has charge of the fortification service and the pioneer duty. It numbers 2 generals, 20 staff officers, 230 other officers, and embraces 1 guard and 8 pioneer divisions, besides 2 reserve divisions; in all 20 companies of 111 men, each of which forms 2 sapper, 1 miner, and 1 pontonier section. Two companies of 219 men (in the field 628 men) form a division. The guard has 280 men and 12 mariniers. Each division has also a pontoon train, in the field 206 pontoons, 54 train wagons, 1152 men of the train, and 2214 horses. The pioneer uniform is that of the artillery, with white lace for the guard, black belts, and white buttons. The arms, a fascine knife, sharp in front, the back toothed like a saw, and a bayonet-carbine. Besides these, each pioneer carries one of the most necessary entrenching utensils.

THE AUSTRIAN MILITARY SYSTEM. The Austrian army stands under the general command of the Aulic or Ministerial Council of War (*Hofkriegsrath*), and consists of 12 general commands, each of which contains several divisions, each under a lieutenant general and made up of 2 to 3 brigades (each of from 4 to 8 battalions or squadrons) under a major general. The general officers were, a few years ago, 4 field marshals, 20 generals, 98 lieutenant generals, and 122 major generals, all active, and about the same number inactive. The uniform of generals is a white dress-coat with white collar, red cuffs and skirt facings, red pantaloons with gold lace, sword in golden baldric; cocked hat with green feather. The designations of rank: field marshal, embroidery on cuffs and collar; general, two strips of lace on the sleeve; lieutenant general, one strip of lace $2\frac{1}{2}$ inches wide; major general, one strip 2 inches wide. Undress uniform: pike-grey with red collar and cuffs. Generals who have had the rank of colonel in the Hungarian cavalry wear hussar uniform, red dolmans and red breeches, white pelisse trimmed with sable, bear-skin cap with white heron plume; sabre and sabretache. The designations of rank for the remainder of the officers, who wear sword-knots of black and gold with yellow and black silk sash, but no epaulettes, are displayed upon the shako; for the lieutenants, lace two inches wide, black in the centre, gold at the sides; captain of cavalry and infantry the same, gold in the middle, black at sides; and the staff-officers, in addition to this, narrow lace around the shako and lace one inch wide about the cuffs. If the regiment wears helmets, the officer has on his a black and gold crest. The non-commissioned officers have lace like the officers, according to their different grades, but of wool; lance-corporals only a black and yellow cord. Sword-knot for all of yellow silk.

The troops consist of guards, who, however, are not reckoned among the field troops. To these belong: 1. The Arcieren Guards, composed entirely of persons who have served as officers, from captains upwards; 56 men with 12 officers, who, down to the second lieutenant, have been generals in the army, the sergeants have been staff-officers. They are

all mounted on black horses, and have deep red uniform, with black collar and cuffs and gold lace. 2. The Hungarian Body Guard, composed of young Hungarian nobility; the officers have all been generals, staff-officers, or captains of cavalry in the army; there are 4 of them and 65 guards, all mounted on white horses. They wear bright red dolmans with silver, a tiger-skin instead of the pelisse, bear-skin cap with heron plume, red pantaloons, and yellow boots. 3. Lombardo-Venetian Body Guard, composed of young Italian nobles, 60 strong. It and the Hungarian Guard serve as a preparatory school for officers. The uniform is red with deep blue velvet collar and cuffs, white pantaloons, yellow epaulettes and aiguillettes, silver helmet. 4. Halberdier Life Guards in Vienna and Milan: 4 officers, 12 non-commissioned officers, 110 men, and 5 musicians. Uniform as No. 1, but halberds as weapons. 5. The Palace Guard: 4 officers, 24 non-commissioned officers, 250 men, 4 drummers. Uniform pike-grey with black hats, white pantaloons, and high boots. Arms: bayonet-carbine and short sabre.

The infantry consists: 1. Of 61 regiments of the line, of which 15 are Hungarian, 13 Galitzian, 8 Italian, 8 Bohemian, 5 Austrian, 4 Moravian, 3 Illyrian, 4 Silesian, and 1 Styrian. Each regiment, save the Hungarian, has, besides two grenadier companies, 2 battalions of six and 1 of four companies. To these in time of war are added the landwehr, but not to the Italian regiments. The infantry company has 4 officers, 14 non-commissioned officers, 12 lance corporals, 2 drummers, and 186 men. The regiment has, without the grenadiers, 3562 men in peace, and 4437 in war. The Hungarian regiment contains in peace 4434, in war 5759 men. The arms: muskets with bayonets and percussion locks; 120 men in each regiment have rifles with sword bayonets. The bayonet is carried in the belt instead of a sabre; belts white. The uniform is white with collars and cuffs of various colors; pantaloons deep blue, shakos with metal ornaments and pompon (*pl. 21*, upper *fig. 2*, an officer, *fig. 6*, private). 2. Of the grenadiers: they form 20 battalions, which are composed of the grenadier companies of the different regiments of the line. A grenadier company has 3 officers, 15 non-commissioned officers, and 155 men. The uniform is as for the infantry of the line; instead of the shako the grenadiers wear the bear-skin cap, with red sack and sabre (upper *fig. 5*, a drummer, a sapper, and a grenadier). Of late the grenadiers also wear deep-blue pantaloons. The Hungarian grenadiers (*fig. 4*) have tight deep blue pantaloons, trimmed with black and yellow cord, and laced boots (*Baganschen*). The officers (*fig. 3*) have tight pantaloons trimmed with black and gold also, and top-boots (*Zischmen*) sewed and with the tops falling half way down the shin. 3. Of Border Troops (*Grenztruppen*): 17 regiments of (*Czaikisten*) light troops are organized in a peculiar manner along the southern boundary of Dalmatia as far as Bukowina, seventeen circles of territory being placed under an entirely military constitution. Each regiment has 2 battalions and numbers 2727 men. The Siebenbürger regiments, however, only 2677 men. Each regiment has 240 riflemen and 50 artillerists. With the (*Szekler*) frontier hussars, the

frontier troops number 50,000 men, in war 80,000, and when all the serviceable are called out, 214,000 men. They are armed with bayonet-muskets and sabres; the uniform is brown with cuffs of all colors; belts black; buttons yellow and white; pantaloons as in the Hungarian regiments (*fig. 1*, an officer; *fig. 7*, a private). 4. Of Jägers: consisting of 1 Tyrolese Jäger regiment of 24 companies in 4 battalions. The company has 4 officers, 20 sergeant-majors, 12 sergeants, 12 lance corporals, and 184 men; in all (with the staff), 5459 men. Also 12 Jäger battalions, in peace of 1278, in war, of 1490 men. Arms: the first and second rank, smooth-bore jägers and sabres; the third rank, rifles with sword bayonets (*pl. 21*, upper *fig. 8*, an officer and private). Uniform: pike-grey, with green collar and cuffs and yellow buttons; pike-grey pantaloons; round Corsican hat with upturned brim; black belts; boots and gaiters.

The cavalry consists: 1. Of 6 Cuirassier regiments, of 3 divisions each of 2 squadrons 165 strong. In war, a cuirassier regiment consists of 1294 men, with 1283 service horses. Arms: long straight sword (*Pallasch*), two pistols, black-lacquered half-cuirass. Uniform white, with colored collar-flaps and cuffs, deep blue pantaloons, helmet black. German saddle with cover of white lamb's-wool, bound with red; red shabrack with yellow binding (gold lace for officers). 2. Of 6 Dragoon regiments, strength as above. Arms: sabre, long carbine, two pistols. Uniform the same as cuirassiers, only without cuirass. 3. Of 7 regiments of Light Horse of 4 divisions and 8 squadrons, containing in peace 184, in war 208 men, whence the regiment numbers in peace 1518, and in war 2044 men, with 1972 horses. Arms as above, only short carbines and rifles. Uniform: 4 regiments white; 3 green, otherwise same as the dragoons. 4. Of 12 Hussar regiments, whose strength and arms are in all respects the same as for the light horse. Uniform for 3 regiments, dark blue; for 2, deep blue; for 3, light blue; for 4, dark green. Pelisse, pantaloons, and dolmans of the same color; only for the green hussars the pantaloons are dark red. Top boots with turned-down, falling tops (*Zischmen*). For common service the hussars wear blackish grey pantaloons and common boots. Shakos for 5 regiments black, for 7 colored, with black and yellow plumes. 5. Of 4 Ulan regiments: formation as in the light horse; arms the same also, and in addition, a lance with black and yellow pennon. Uniform green with red; shakos yellow, green, red, and white, with yellow cap cord, and horse-hair plume. Officers have full golden epaulettes and golden cap cord.

The artillery consists: 1. Of the bombardier corps, 5 companies, 2082 men. School for the artillery officers. 2. Five field-artillery regiments of 4 battalions, 3663 men; they man in the field the 3-, 6-, 12-, and 18-pounder batteries. Each battery has four guns and two 7- or 18-pounder howitzers; the field-artillery man also the cavalry batteries, which consist of six 6-pounders. Most of the gunners and matrosses can drive also. The field-artillery can man 200 batteries. 3. Of the rocket or firework corps, containing 4 companies or 766 men, which in war can be still further increased. It mans 16 congrève-rocket batteries of 6 stands each. 4. Of

garrison artillery, mostly half invalids. Arms: sabre. Belts white. Uniform dark brown with red; one row of yellow buttons. The officers have gold lace and cocked hats, while the privates have Corsican hats, with black and yellow feather plumes.

The engineer corps has: 1. One engineer-director, 2 lieutenant generals, 7 generals, 36 staff and 136 other officers, and 7 cadets. Uniform light blue with cherry-red, yellow buttons, and hat with feathers. 2. Five companies of miners of 152 men; with the staff, in all, 830 men. 3. Six companies of sappers of 149 men, with the staff, 1058 men. Uniform for both light blue and crimson; shakos black, with suitable emblems in brass-plate; belts black. 4. Pioneers: 2 battalions of 4 companies; in war, 3 battalions. The corps has in peace 2004 men, in war, 3051. Arms: muskets and fascine-knives. Uniform: pike-grey and green; white buttons; pike-grey pantaloons; shakos with horse-hair plume. 5. Pontoniers: 6 companies of 150 men; in all, 918 men who manage the Biragosche bridge-trains. Arms: carbines and sabres; black belts. Uniform: light blue with red; white buttons; shakos with horse-hair plume.

THE FRENCH MILITARY SYSTEM. The Army of France belongs to the oldest of standing armies, for King Charles VII. established in the 15th century 5 *compagnies d'ordonnance*, each of 500 knights and 5000 light horsemen, who wore uniform tabards. To these Louis XI. added 6000 Swiss and 10,000 French infantry. In 1610, Henry IV. had already 37,000 men, and after the peace of the Pyrenees, in 1659, the French army amounted to 100,000 men. After the peace of Nimeguen, Louis XIV. had 138,482 men, who during the war of the Spanish succession were increased to 392,233, but were diminished again afterwards. Louis XV. had in 1759, 33,000 men, subsequently 159,016, who were diminished under Louis XVI. to 147,236. The army of the first republic, 139,500 men strong in 1792, had in 1794 increased to 1,169,144 men, of whom 749,545 were then under arms. In the year 1825 the French army contained 182,385 men.

At present the defence of France is intrusted to a standing army and to the National Guard. The National Guard was organized on the very day after the taking of the Bastille, but after the Revolution of 1830 was re-established and first attained its full splendor. With very few exceptions every independent man from 20 to 60 years of age, not disgraced by crime, is liable for service. The organization is entirely military. In each *arrondissement* the National Guard is arranged into companies, battalions, and regiments; each company has a small, each battalion a large color (*drapeau*). The state provides the arms, the individual his uniform. The officers, chiefs of battalion and squadron, and non-commissioned officers, are chosen for three years by the guard themselves; the higher officers are designated by the government from ten candidates proposed to it. If the service lasts longer than one day their pay and subsistence can be required as in the line; longer than two months the service cannot endure. On the register are found 1,871,078 men of *arrondissement* infantry, 1,823,958 of *canton* infantry, 10,415 cavalry, 19,015 artillery, 54,723 sappers, 2012 marines and laborers, in all 3,781,206 uniformed men, of whom, however

only one million is armed. The uniform and arms of the National Guard differ little from those of the standing army; the arms given them are indeed those which have been previously in use by the troops of the line. *Pl. 19, lower fig. 11*, represents a captain, and *fig. 12*, a private of the grenadier corps of the National Guard. The frock-coats are blue, with blue red-edged breast-facings; collars, cuffs, and skirt-facings red, the epaulettes of red wool for the rank and file, and for the officers of silver, who have also a silver crescent below the collar in front. Belts white. The officers have curved sabres. The bearskin cap is black, with a metal plate and red tuft. Pantaloon red in winter, in summer white, boots and white gaiters. The uniform of the chasseurs corresponds exactly with the above described, save that the covering for the head, instead of the bearskin cap, is a shako, with pompon, cap-plate, and red binding. The cavalry is variously uniformed. *Pl. 20, fig. 18*, is an officer of light cavalry. The jacket is dark blue, with blue red-edged breast-facings, pantaloon blue with red trimmings, and the cap (*chapka*) the same color, with silver-mountings and cap-cord, and red horsehair tuft. Epaulettes silver, belts white. Shabrack and valise dark-blue with red trimming.

With respect to the standing army, France is divided into 24 military districts, each of which comprises within it several departments. France had a short while since nine marshals; the superior general staff forms two sections, one of which contains the active generals, the other those of the reserve. The first should not number in time of peace more than 80 lieutenant generals and 160 brigadier generals (*maréchaux-de-camp*), the second is unlimited. The peace establishment of the French army is fixed at: 1. 100 regiments of line and light infantry of 3 battalions, with 7 companies. The arms consist of bayonet-muskets and the so-called sabre-poniard, a short straight sword in the waist belt on the left side, the bayonet in its scabbard on the right. Uniform: frock-coat (*blouse*) reaching to the knee, blue, with collar of some other color, and edgings in front and on the cuffs, according to the color of the collar; red pantaloon and epaulettes; belts white; shakos black, bound with yellow or white, with brass agraffe, pompon, and cap-cord. *Pl. 19, lower fig. 1*, a chief of battalion (*chef-de-bataillon*): blue body-coat, with collar and skirt facings of different colors. Silver epaulettes with full fringe and crescent. Red pantaloon. On the shako the tricolor feather plume, red at top, then white, blue below. *Fig. 2*, a captain; uniform the same; light epaulettes, and on the shako a pompon with small tuft. *Fig. 4*, a first-lieutenant and color-bearer: one half and one full epaulette and crescent; shako with pompon and short tuft; red sash; the color from the staff out blue, white, and red; the bands tricolor also with gold borders; the Gallic cock, which forms the staff-head, gilded. The sous-lieutenants have only two half-epaulettes; the non-commissioned officers are distinguished from one another in rank by chevrons on the cuff, and the years of service are indicated by chevrons on the arm above the elbow. *Figs. 5 and 6*, show non-commissioned officers. *Fig. 8*, a private of infantry, line or light. *Fig. 3* is a drum-major, and *fig. 7* a sapper of the same infantry, their uniform corre-

sponding in all respects with that of the regiment to which they belong. 2. 10 battalions of foot-chasseurs, each of 8 companies. Arms: rifles and sword bayonets made to fix. Uniform: blue frock with different edgings about the collar, cuffs, and lapels; grey pantaloons; black gaiters and boots; green woollen epaulettes with brass crescent; black belts; grey shakos, with black trimming and horsehair tuft, for parade; at other times oilcloth cover and pompon. *Pl. 19*, lower *fig. 9*, chasseur d'Orleans in marching equipment; *fig. 10*, in parade-dress; and the other at *fig. 9*, in camp costume: blue jacket; grey linen pantaloons; green shoulder strap; blue forage cap with edging. 3. 1 regiment foot Zouaves in Algiers, of 3 battalions, with 9 companies. Uniform: blue red-edged jacket; blue turban with red fez; wide, red, Arabian trowsers and gaiters. Arms: bayonet-muskets and sword-bayonets. 4. 3 battalions of light infantry in Africa, each of 10 companies. Uniform: blue frock with different colored collar; red pantaloons and shakos; white epaulettes and cloak. 5. 12 discipline and punishment companies (*compagnies de punition et discipline*); and 1 foreign legion, in 2 regiments of 3 battalions, with 8 companies.

The cavalry consists of 10 regiments of cuirassiers of 5 squadrons, which in war can be increased by one. 2 regiments of carbiniers; 12 regiments of dragoons; 8 of lancers or ulans; 13 of *chasseurs à cheval*; 9 of hussars. Besides these, in Africa: 4 regiments *chasseurs d'Afrique*; 3 squadrons of Spahis in Bona, and 4 regiments of regular Spahis in Oran. Arms: long sabre, but slightly curved, and with basket-hilt, and for the reserve and line cavalry long carbines, as with the German troops. Uniform: very showy, dressy, and rich. Carbiniers and cuirassiers, blue jackets, with helmets, and back and breast cuirass; dragoons green, with helmets also; lancers light blue with red collar and cap; chasseurs green, faced with yellow, with white buttons, red shakos, sugar-loaf form cut off at the top; hussars with pelisse and dolman of various colors; the Spahis very elegantly clad in the Turkish fashion. Saddles-covers throughout of white sheepskin with the wool. *Pl. 20*, *fig. 12*, shows an officer of cuirassiers; *fig. 11*, a standard-bearer of carbiniers. *Fig. 13 a*, a trumpeter, and *fig. 13 b*, a private of dragoons. *Fig. 14*, a chasseur with the now abandoned bearskin cap, in place of which the shako is at present used; *fig. 15*, a chef-d'escadron of lancers (the pennons are red above, white in the middle, blue below). *Fig. 16*, an officer, and *fig. 17*, a private of hussars. *Fig. 19* is an aide-de-camp.

The artillery consists of 14 regiments, to 10 of which belong 15 batteries each, and to 4 fourteen batteries each, so that they man in all 206 batteries, of which 32 are flying artillery. Each battery contains nine 8- or 12-pounder guns. To the artillery belong also 1 regiment of pontoniers of 12 companies, and 12 artificer companies; half a company of armorers, and 4 squadrons of train. Arms, as for the infantry, the musket with slings. Uniform: blue jackets edged with red, with the same kind of collar, red cuffs, yellow buttons and red epaulettes; white belts; blue pantaloons with red stripes; shakos with cross-cannon, red cap-cord (gold for officers), and red horsehair tuft.

The engineer corps consist of 3 regiments, each of 2 battalions, composed of 1 miner and 7 sapper companies. Each regiment has in addition 1 company of sapper conductors, and 2 companies of laborers. Arms as in the infantry, but shorter muskets. Uniform: blue, edged with red, collar and cuffs black, white buttons.

The whole French army numbers: the general staff, 3879 men and 318 horses; the gendarmerie, 14,663 men and 10,316 horses; the infantry, 291,408 men and 516 horses; the cavalry, 55,531 men and 49,046 horses; artillery, 35,410 men and 49,906 horses; engineers, 8,753 men and 1150 horses; military train, 6,729 men and 5,539 horses; veterans, 3,789 men; government of Algiers, 1,426 men and 207 horses. In all 421,588 men and 91,708 horses. To these are to be added the contingent troops of natives of Algiers, 4,321 men and 1,840 horses.

THE BELGIAN MILITARY SYSTEM. Before the separation from Holland (1831), there was no Belgian army, and even immediately after the separation as good as none. Most of all, efficient officers were wanting, and not until the year 1833 had any sufficient organization been reached. General Gœthals, Count d'Hane, and Dufailly strove in succession, but vainly, to put a regular army on foot, until at last De Brouckere, then Minister of Finance, undertook the war department, and by his great circumspection and activity, accomplished much. The volunteer corps was disbanded and divided among the chasseur regiments. In the administration, the very strictest severity was practised, every mal-practice punished by cashiering, and all inefficient officers dismissed; in their place experienced French officers were employed, and 20,000 men from the first ban of the militia were drafted to the army, and drilled at the garrisons. The infantry was increased by two line and two chasseur regiments, and the mounted regiment raised from four to six squadrons. In the course of three or four months, the king could control more than 48,000 men, 3,000 horses, and 60 cannon. After De Brouckere had sent in his resignation, the artillery general, Evain, completed the organization. At present, the Belgian infantry consists of three regiments of chasseurs of three battalions, with six companies, one regiment of élite troops of four battalions, twelve regiments infantry of the line of three battalions, and seven regiments reserve, altogether twenty-three battalions. The armament is throughout like the French, and the uniform also after the French cut. The line infantry has blue coats, woollen epaulettes (the officers gold or silver, and for all grades double), red cuffs and skirt facings, dark breast-facings, yellow edged, grey pantaloons, red edged, white belts, shakos in the French style. The chasseurs have green coats.

The cavalry has two chasseur regiments of six squadrons, two of lancers of six squadrons, two of cuirassiers of four squadrons, one of guides of six squadrons. *Pl. 22, fig. 12*, is a chasseur of the 2d regiment. Uniform: green jacket and pantaloons, red collar and skirt facings, the cuff red edged; red trimmings on the pantaloons, white epaulettes, and red shako, with white cap-cord, and horse-hair tuft; white belts, green shabrack, with red trimmings, saddle cover of white sheepskin. For parade (*fig. 11*), officers have

white pantaloons. *Fig. 14*, an officer; *fig. 15*, a private of lancers or Ulans, 2d regiment; blue pantaloons and jackets, with yellow breast-facings, collars, cuffs, and skirt-facings, yellow stripes also on the pantaloons, and yellow shakos, with white horse-hair tuft; white belts and epaulettes, white cap-cord (officers silver and silver sashes), lance with pennon, yellow above, red below; blue shabrack, with yellow trimmings, black saddle cover. *Pl. 22, fig. 10*, cuirassier officer: double, white, polished cuirass, iron helmet, with horse-tail and white feather plume, long straight sword (*Palasch*), blue pantaloons and jacket, with yellow collar, skirt-facings, and edgings, and yellow stripes on the pantaloons; silver epaulettes, blue shabrack, with white binding. *Fig. 13*, officer of the regiment of guides: green pantaloons and jacket, with green, white-edged collar and cuffs, and white stripes on the pantaloons, pink breast and skirt-facings, silver epaulettes and cap-cord, white belts; high, upright, bear-skin cap, with red calpac and white feather plume, and also, for ordinary service, a black shako; green shabrack, with white trimmings, saddle cover of white sheep-skin, bound with red.

The artillery consists of three regiments, who man altogether 15 batteries with 130 pieces 6-and 12-pounders and howitzers. *Fig. 16* is an officer; *fig. 17* a private of flying artillery. Uniform: dark blue pantaloons and jacket, with red-edged collar, red cuffs, skirt-facings, and stripes on the pantaloons, and red epaulettes, cap-cord, and shako trimmings (gold for officers); belts white, with yellow grenades, black shako, with brass cross cannon, black horse-hair tuft; blue shabrack, with red binding (for officers gold). Arms: curved sabre and pistols. To the above artillery must be added: 1 squadron artillery train, 1 company pontoniers, 1 company artillery artificers, 1 company artillery armorers.

The engineer corps consists of two batteries of sappers and miners. *Figs. 18 and 19* are officers; *fig. 20* is a private of the engineer corps. Arms: short bayonet-musket and sabre. Uniform: blue coat and pantaloons (the latter white in summer), the coat edged with red, with grenades on the skirts, pantaloons with broad red stripes; red epaulettes and shako trimmings (gold for officers); grenade on front of shako.

THE ENGLISH MILITARY SYSTEM. In England, even when Scotland and Ireland were united with her, there was for centuries no standing army, but the inhabitants capable of bearing arms were called together when a war commenced, and disbanded again when the war was concluded. Thus was it still, on the side of the people, even in the civil war, although the king had then a kind of standing army. Afterwards, the army was increased, and at the time of the seven years' war it amounted to 100,000 men. In the French revolution the army was yet further increased, and had risen in 1805 to 200,000 men, and in 1814 to more than 450,000. The king is commander-in-chief of the army, and the Parliament has no share in the control or organization of the same, the general whom the king appoints to the command being responsible to him alone. The secretary of war has to do only with the financial relations. Without consent of Parliament, no standing army at all can be brought on foot, and the present one is granted

only from year to year, and of such strength alone as parliament permit. Should the appropriations not be made for the new year, then the army must be dissolved. In England, no form of conscription exists, but there is only voluntary enlistment for bounty-money, at first for seven years. Each regiment has its recruiting district. The punishments are very severe, and corporal chastisement is yet practised. Officers' commissions, as high as a lieutenant colonelcy, are purchasable, and the established price for a lieutenant colonelcy in the foot-guards is 7,250 pounds sterling, and so down to the ensigncy, which costs 1,200 pounds. In the line, the price of the same commissions is 4,500 and 450 pounds, but these places are often purchased much higher. To guard against abuses, various restrictions are imposed, and the king appoints to the places vacated by death. We refer here only to the European army of Great Britain.

The general staff consists of 6 field-m Marshals, 90 generals, 106 lieutenant generals, and 216 major generals. All officers included, there are twenty-three soldiers to one officer. The commissioned officers are 7,532 in number; the non-commissioned, 28,000. *Pl.* 21, lower *fig.* 1, is a general of infantry. Uniform: red, with blue, richly embroidered collar and cuffs; golden sash and epaulettes; hat with yellow agraffe and white plumes; shabrack and holsters, purple velvet and gold; head-gear red, richly stitched with gold.

The infantry consists of: 1. Three regiments infantry of the guard, the Grenadier guards having 26, the Coldstream and 3d regiment having 16 companies of 45 to 90 men each. The infantry have bayonet-muskets, and the bayonet in its sheath on the left side. Lower *fig.* 2 shows an officer of the grenadier guards. Uniform: red, with blue collar and cuffs, the collar richly embroidered with gold, and with the star of the Order of the Garter, the cuff with gold flaps; white skirt facings and white pantaloons. Red silk sash; rather straight sabre; full gold epaulettes; bear-skin cap, with gold tassel; white tuft and red top, with the star of the Garter. Yellow buttons; white baldric, with plate and star over the right shoulder, in which the sabre is carried. 2. 100 regiments of infantry, each regiment of 10 companies, save the 68th, which has 20. Six regiments of these are Highlanders, eight light, and four fusilier regiments. Lower *fig.* 3 is an officer of the 75th regiment (grenadier). Red uniform, with white collar and cuffs, the collar with embroidered lace; the cuffs with red flaps, edged with white. Yellow buttons; instead of epaulettes, gold wings. Red silk sash, white baldric, with gold plate; bear-skin cap, like the guards; pantaloons white. Arms: a rather straight sabre. *Fig.* 4, officer, and *fig.* 10, private of infantry. Red uniform, with yellow collar, cuffs, flaps, and buttons; full gold epaulettes, collar standing, shako with gold plate, gold cap-cord, and white feather plume; dark red sash, and white pantaloons. The sabre is suspended from a white baldric with a gold plate, over the right shoulder. *Fig.* 5, officer of the 9th light infantry regiment. Uniform: red, with yellow cuffs and collar, laced, and with red flaps; instead of epaulettes, gold wings on the shoulders; dark red silk sash; white pantaloons; black shako, with gold plate, and pompon without cap-

cord. Arms: straight sabre, in white baldric, with gold plate and chains. *Fig. 6*, officer of the royal Highlanders. Red uniform, with black collar and cuffs, yellow flaps and buttons, gold-wrought lace on the collar, and gold wings on the shoulders. No pantaloons, but only the Scotch kilt of green and black tartan. White sporran, with gold tassels. Shoes, and plaited buskins. The sash, of dark red silk, is worn over the shoulders from left to right, the knot over the right hip. Black bear-skin cap, with green, red, and white lower part, and red feather plume. Arms: straight sword with basket hilt, hung over the right shoulder by a baldric with gold plate, and a long dagger on the right hip. *Fig. 7*, private, and *fig. 8*, drummer of Highlanders of the line. Uniform: red jackets, with blue collars, breast-facings, and cuffs. Yellow lace on collars, breast-facings, and skirts; white skirt facings and white wings; belts also white. No pantaloons, but kilt of black and green tartan; shoes and plaited white and brown gaiters; bear-skin cap, with red and white chequered lower part and white tuft. The drummers decorated with blue and white lace and chevrons. Arms: bayonet-muskets. 3. One light brigade, consisting of two light infantry and rifle battalions (of 10 companies). Arms: rifles and sword-bayonets. *Fig. 9*, officer, *fig. 11*, bugler of rifles. Uniform: green coat, with black collar and cuffs, and woollen wings. The officers have green pelisses like the hussars, with black trimmings and lace. Green pantaloons (officers with silver stripes); black belts; officers with silver plate and chain, and the sabre hung with strings. Black shakos, with leather trimmings, yellow plate, and pompon.

The cavalry consists of: 1. Three regiments Life-Guards, of 8 companies of 50 to 60 men. *Pl. 22, fig. 1*, is an officer of the "Queen's Own" Life-Guards. Arms: straight cuirassier sword with basket hilt, white cuirass with breast and back piece. Uniform: red coat, with blue skirt facings, collar and cuffs entirely covered with gold embroidery. Gold epaulettes, aiguillettes, sash, bandolier, and baldric, gauntlet-gloves, and tight pantaloons, white, with high boots; lofty bear-skin cap, with gold tassels and white tuft; head-stall richly stitched with gold; blue shabrack, with gold trimmings bound with red. Mounted entirely on black horses. *Fig. 2*, officer of 2d regiment Life-Guards. Arms and uniform the same in all respects as for the Queen's, only instead of the bear-skin cap, silver helmets, with gold plate and binding, and black crest. *Fig. 3*, an officer of the 3d Life-Guards. Uniform and arms as for the 1st, save that the coat is blue instead of red, the gold embroidered collar, cuffs, and skirt facings red instead of blue, and on the somewhat lower bear-skin cap a dark red feather plume. The shabrack scarlet, with gold trimmings and embroidery. Mounted entirely on brown horses. 2. Seven regiments dragoon guards, of 8 companies, and 3 heavy and 13 light cavalry regiments of 8 companies of 50 to 60 men. *Fig. 5* shows an officer of heavy dragoons. Arms: long straight sword and pistols, the private with carbine besides; yellow helmet, with black horse-tail. Uniform: red coat, with yellow buttons, white collar and cuffs, richly embroidered with gold, and white skirt facings; golden bandolier and baldric (privates white), white sabretache,

with gold embroidery, gold sash and cartridge box, gold epaulettes ; blue pantaloons, with gold stripes (red for privates) ; blue shabrack, trimmed with gold, bear-skin saddle-cover, bound with red. *Fig. 4*, officer of 10th light dragoon regiment. Dark blue pelisse, dolman, and pantaloons ; pelisse and dolman very rich, with gold lace and cord ; pantaloons trimmed with gold lace (woollen for privates) ; gold baldric (privates, white leather belts) ; red sabretache, gold embroidered, and with gold lace ; round bear-skin cap, with red calpac, gold cord, and white heron plume ; red shabrack and saddle-cover, trimmed with gold. Arms, sabre and pistols, the privates carbines also. *Fig. 8*, officer of 1st hussar regiment. Bright blue pelisse and dolman, with silver cords (white woollen for privates), and black fur trimmings. Red pantaloons, with two gold stripes ; red shako, trimmed with gold, and black horse-hair tuft. Black belts and sabretache, with gold plate ; blue shabrack, with white binding, red notched ; bear-skin saddle-cover, red cloak-bag ; head-stall white, holsters red. *Pl. 22, fig. 9*, officer of 11th hussar regiment. Dark blue pelisse and dolman, with rich gold cords, lace and black fur trimmings ; crimson pantaloons, with gold stripes ; gold bandolier and baldric ; red sabretache, with gold cypher and binding ; holsters with bear-skin cover ; head-stall and trappings red, richly worked with gold ; round black bear-skin cap, with crimson calpac and white heron plume. *Fig. 6*, officer of 1st lancers regiment. Arms : sabre and pistols, and for the privates, lances with pennons, blue above, red below. Uniform : red jacket, with black collar and cuffs, and white skirt facings, the collar richly embroidered with gold, and the cuff with gold flaps. Yellow buttons, and gold bandolier and baldric ; blue shabrack, with gold name-cypher and binding ; blue pantaloons with broad gold stripes (red for privates) ; cap, black below, with gold sun, dark blue above, bound with gold ; gold cap-cord and epaulettes (privates woollen) ; green drooping feather plume ; dark blue shabrack, with gold name-cypher and trimming ; tiger-skin saddle-cover, bound with gold lace ; head-stall of light calf-skin. *Fig. 7*, private of 9th lancers. Arms as above. Uniform : dark blue jacket with crimson collar, cuffs, and skirt facings, and gold lace ; dark blue pantaloons, with crimson stripes ; yellow girdle and buttons, yellow epaulettes, white belts, and cap-cord ; cap black below, with gold sun, red above, with blue, white, and red drooping feather plume ; black sabretache ; blue shabrack, with gold trimmings, and saddle-cover of sheepskin ; head-stall black.

The artillery consists of 9 battalions of foot artillery, each of 8 companies, and one brigade light artillery, of 7 companies ; to these the rocket corps is to be added. The arms are : for the foot artillery, a short sabre, for the light, sabre and pistols. Uniform : blue, with red collars and yellow cords, black belts, and white shakos.

The engineer corps consists of 11 colonels, 26 lieutenant colonels, 80 captains, and 106 lieutenants. To this belong also the royal staff corps (pioneers and pontoniers) and the royal sappers and miners, altogether 11 companies.

THE TURKISH MILITARY SYSTEM. The Turkish is probably the oldest of all standing armies, for even in the year 1328, when the Ottoman Empire

received its earliest laws and form of government from Aladdin, the establishment of a standing army was one of the objects to which this lawgiver directed his chief attention ; and this army arose, therefore, not less than 100 years before Charles VII., whom we have hitherto regarded as the founder of standing armies. The organization at that time was like the Roman, with Decurions, Centurions, and chiefs of a thousand, and besides these, Jaga or Piade, footmen, the Jeni Tscheri (new troops, *Janizaries*) were created, who were to consist entirely of Christian children who had been forcibly converted to Islamism. These formed afterwards the flower of the army. The Piades were disbanded, and received land in fee, with the obligation to keep the military roads in order in time of war ; they were therefore pioneers, and their name, with their office, has passed into European warfare. The irregular troops were called Asab (light), and the cavalry of the same Akindschi (runners on horses), and formed predatory, skirmishing, and foraging parties. The Jeni Tscheri (*Janizaries* ; *pl.* 23, *fig.* 1, shows an officer ; and *fig.* 2, a private) formed four bodies, after the manner of the banner guard which the Caliph Omar established for the protection of the holy standard (*fig.* 3), and which consisted of 2400 men. Soliman the Great increased this by 4000 men, namely, 1000 Spahis (horsemen), 1000 Silidhare, mounted militia (*fig.* 6), 1000 Ulufedschi, mercenaries, Chatis (*fig.* 5), and 1000 Ghureba, strangers (*fig.* 3), Arabs from the region about Acre, who were disposed, in four bodies, to the right and left of the holy standard, and formed the body-guard and escort of the Sultan. Besides the paid Spahis, there was formed afterwards an unpaid (feoffee) cavalry, the Mosseliman (freed). The troops were under commanders called Baschi, Pasha (*fig.* 4), who were Szubaschi when they commanded 100, Bimbaschi when they commanded 1000, and when more than 1000, were Sandshack-begs (Princes of the Standard). In the campaign of Szigeth, Soliman had 48,316 men, whose pay amounted to 52,818 ducats. The marines were similarly organized. An admiral had the chief command, under whom were one or more vice-admirals (*fig.* 7) ; then followed the ship captains (*fig.* 8), the marine officers (*fig.* 9), and the marines (*fig.* 10). The troops were carefully trained in war and in peace ; gymnastic exercises particularly were very much practised, all of them designed to give the soldiers that remarkable agility and dexterity for which in earlier times these troops were ever distinguished. Among these warlike games, which even in camp were still practised, we may mention, for the footmen, the Tomak, game of Itsch Oglau (*pl.* 24, *fig.* 4), in which the object was to strike an antagonist with a ball fastened to the end of a long cord, while he sought to avoid the blow, to seize the hostile ball, and strike his opponent with his own. For the cavalry there was the Djerid, game of the Djindis (*pl.* 24, *fig.* 5), in which each sought to hit his antagonist, while at full speed, with a wooden staff or blunt javelin, and each strove to avoid the blow for himself by dexterous movements of the body or of the horse, and with his own djerid to hit his opponent. The djerid, when once thrown, had to be picked up again from the ground without alighting from the horse, and at full speed.

Since the time of Mahmoud II., the Turkish government has been constantly striving to perfect its military system, and bring the Turkish army nearer and nearer to the European organization. At the death of Mahmoud II., the army consisted of 50,000 regular troops. To these could be added 109,700 men of the reserve (*Retif*), which they had sought to form after the manner of the Prussian. In the year 1843 these *Retifs* were disbanded, and in their stead more regular regiments were formed. Besides these there were, in 1829, 10,000 *Topdschis*, or artillerists, after the old mode, miners (*Laghumschiller*), bombardiers (*Kumbaregdschiller*), and 5,000 *Spahis*, and other irregular troops. These, with the exception of the *Spahis*, yet exist, and by means of them the army can be increased to 200,000 men. The irregular troops are arranged in squads of 60 men, under command of *Boluk Baschis*; they arm themselves, the infantry with muskets without bayonets, and short sabres; sometimes, also, a small iron cuirass, inlaid with gold, silver, or copper. The cavalry consists mostly of Asiatics; they have long muskets and Turkish sabres, and their mode of fighting is the modern Greek. For attacks in line they are unfit. Since 1840, the following improvements have found place in the regular army, after the doing away with the reserve. Eight new infantry regiments have been formed, and the artillery so increased, that two guard and four line-infantry regiments were stationed in Constantinople, and the present strength of the standing army can be put at 100,000 men.

The Seraskier commands the army; the Guard, which is independent of this, is commanded by a *Beglerbeg Vizier*, with the title *Muschirci Esakirsi Chassai*. For the cavalry and the infantry, the French tactic; for the artillery, the Prussian is used. The infantry is called *Piade*, the cavalry *Suvarri*, the artillery *Topdschi*. The general of an army corps, or General-in-Chief, is called *Muschir*, or Pasha of Three Horse Tails; *pl. 24, fig. 2*, is a view of the encampment of a Pasha of Three Tails, as it was in 1840. In the foreground is seen the Pasha (*fig. 3*) with his suite, to whom the body-guard pays the usual honors. The divisions are called *Feriks*, and the chiefs of divisions *Feriki Pashas* of Two Tails. A brigadier general, *Liwa Pasha* (*fig. 1*), bears one tail. The regiment is called *Alai*; its colonel, *Mir Alai*, has under him a lieutenant colonel, *Kaimakan Beg*. Each regiment consists of four battalions (*Tabur*), each under a major (*Bim Baschi*, commander of a thousand). The battalion has eight companies, of which four are always marksmen. The company is commanded by a captain (*Jüs Baschi*, commander of one hundred), and is divided into ten squads, each under a non-commissioned officer (*On Baschi*). The sergeant (*Utsch Baschi*) has two *On Baschi* under him. In the infantry each company has two lieutenants (*Mulassim*); in the cavalry four. The rank and file are called *Nefer*, the music *Mehterchane*. The armament is European; the infantry have bayonet-muskets, the subaltern officers sabres like the German, the staff-officers the old Turkish sabre. The cavalry have lances fourteen feet in length, with red pennons, sabres, and two pistols; the saddles are a combination of Hungarian and English, with German stirrups; blue shabracks with red binding. The uniform is dark-blue, with red collar. Privates and

non-commissioned and subaltern officers wear jackets, corded with red, for the cavalry. The guard has breast-facings, with gold lace. Besides this, there are other cavalry, whose dress approaches nearer to the old Mussulman garb. The head-covering is, with few exceptions, the Turkish red fez, with blue tassels. The pantaloons are blue, very full, with red stripes (gold for officers); in summer grey linen. A part of the cavalry has full white pantaloons, with high boots; but, with this exception, the dress for the feet consists of shoes and socks. Up to this time only officers wear stocks; the staff-officers wear capotes, with red collars. All in authority are distinguished by a crescent and star suspended on the breast; generals and staff-officers have them of diamonds, distinguished from one another by size and position; on the subaltern officers they are of gold, and for the non-commissioned silver. The staff-officers wear at present full gold epaulettes, the generals with bouillons. Belts black; the waist belt with brass plate. The officers have red, the non-commissioned officers white baldrics, worked with gold. Except on service, no weapon is carried usually. The liability to service is general, and the period five years. *Pl. 23, fig. 11*, is an officer of guard-cavalry; *fig. 12*, an artillery officer; *fig. 13*, an infantry soldier; and *fig. 14*, shows officers of the regular line-infantry; *fig. 15*, a non-commissioned officer of the Egyptian heavy cavalry; *figs. 16 and 17*, men of the Egyptian light cavalry.

THE VARIOUS KINDS OF ARMS.

For the better understanding of various weapons, parts of dress, and army-implements, we have brought together a great number of such objects on *pl. 25*. 1. Cutting weapons: *a*, cavalry swords; *fig. 18^a*, French heavy cavalry sword, pattern of 1803, with iron scabbard; the blade (*fig. 18^b*) has two grooves, and is ground to a point obliquely from the edge to the back; the cross section of the same, with a view of the hilt and basket seen from above, is shown in *fig. 18^c*. This is also the sword of the Austrian heavy cavalry. The French heavy cavalry sword pattern of 1816 (*fig. 19^a*) has likewise an iron scabbard; the blade (*fig. 19^b*) has also a double gutter (*fig. 19^c*), but it is ground to a point from both sides; hilt and basket (*fig. 19^c*) are like the first also, but somewhat slighter. This sword is carried also by the Prussian heavy cavalry. The French heavy cavalry sword, pattern of 1822, the newest pattern (*fig. 20^a*), has also an iron scabbard, but is somewhat longer, and the blade (*figs. 20^b, 20^c*) is slightly curved to the back; the grooves, also, are narrower, whereby the cutting wedge, which before was very blunt, becomes sharper. The basket (*fig. 20^c*) is made stronger below. *b*. Curved sabres: the sabre of the French light cavalry, pattern of 1803 (*fig. 21^a*), has an iron scabbard, and is very heavy; the blade (*fig. 21^b, 21^c*) has one broad groove, tapers somewhat sharply to the point, and is strongly curved backwards. The hilt (*fig. 21^c*) has three strong bows and no stool, and the gripe has a rivet through the tang. The same blade, but with a single bow instead of the basket, is used by the

Prussian light cavalry; the sabre, too, is somewhat lighter. The French light cavalry sabre, pattern of 1816 (*fig. 22^a*), has an iron scabbard, the blade (*fig. 22^b* and *22^c*) is strongly curved backwards, but has no groove, only a round back and sharply wedge-shaped edge. The hilt (*fig. 22^c*) is something lighter than the preceding, has a stool, and the gripe is rather straighter. The same sabre, pattern of 1822 (*fig. 23^a*), with iron scabbard, has a strongly curved blade (*fig. 23^b* and *23^c*) with narrow groove, broad back, and bluntly wedge-shaped edge. The hilt (*fig. 23^c*) has no cross-guard, but the stool round behind. The officers' sabres (*figs. 24* and *25*) are lighter, have no basket, but only a simple bow and a more elegant gripe. The blades are mostly after the form in *fig. 21^c*, or *fig. 23^c*, or even entirely smooth. c. Infantry sabres: The common infantry sabre (*fig. 15*) is in a leather scabbard, little curved, the blade often without grooves, flat wedge-shaped edge, the hilt furnished only with a brass bow and cross-guard, and is carried in this form by most armies; the French army, on the contrary, has adopted in modern times a two-edged infantry sword (*fig. 17*), resembling the ancient Greek, and called "poignard-sabre" from its being more like a dagger than a sword. The French artillery sabre (*pl. 25, fig. 16^a*) is very short, straight, and the blade (*fig. 16^b*) with peculiar grooves, has a very heavy tang, in order that the sabre may be used not only as a weapon but also as an intrenching tool. The yatagan (*fig. 26*), which the expedition to Algiers has brought into the French army, is a dagger-like sabre, with double curved blade about two feet long, the gripe without cross-guard.

2. Thrusting weapons. a. The lance. The old French lance (*fig. 13*), pattern of 1812, has a head quadrangular below and running out in a long quadrangular pyramid to a point; this is put upon the staff without any prongs. Much better than this is the pattern of 1823 (*fig. 14*) with long prongs, and this, with slight variations, is the one used by other armies. b. The bayonet. The most ancient form of this (*fig. 5*) is merely a lance-head, which was stuck into the musket barrel by its wooden staff. Afterwards came a bayonet (*fig. 6*) with curved neck and three-sided, reed-shaped blade, which was slipped on to the barrel by a slit socket and turned so as to catch against a stud on the same, which prevented its being pulled off. The modern bayonet (*fig. 7*) has a long, triangular, hollowed, straight blade, arched neck, and is fixed over a rivet, then turned in and fastened by the bayonet catch. The bayonet for the percussion-musket (*fig. 11*) has only one thick, ring-formed projection, over which the hook of the bayonet-spring (which is fastened to the stock) catches. The blade is very long, three-edged, flat, and sharp pointed. Two bayonets of different forms, the so-called sabre-bayonets, are shown in *fig. 12*.

3. Projectile weapons. a. Muskets. *Fig. 1* is the common infantry musket with flint lock, as now used where the percussion-musket (*fig. 8*) is not adopted. A somewhat larger kind of percussion arm is the wall-piece (*fig. 9^a*), which has a rifled bore and throws a two ounce ball; it is designed for the defence of forts. The French artillery have a shorter musket (*fig. 2*), a kind of carbine with a flint lock, and a long bayonet. The cavalry have carbines (*fig. 3*) with flint locks and a bow, in the ring of which the car-

bine hook is fastened. The riflemen and light infantry have grooved rifles (*fig. 9 b*) with percussion locks and hair triggers, on which, instead of the common bayonet, the rifle sword-bayonet is fixed and held fast by the bayonet-spring, serving both for cut and thrust. The old cavalry pistol (*fig. 4 a b*) was very short in the bore and long-stocked, with the flint lock; the modern is short-stocked (*fig. 10*), longer in barrel, often rifled, and has the percussion lock.

4. Defensive arms. The cuirass (*fig. 27*) which with little variation is used for the heavy cavalry of all armies, consists of a front and a back piece, either of steel or brass, polished or painted black, held together at the bottom by means of straps and at the top by the shoulder-bands. Where only the breast-plate is used, it is fastened by cross straps, which pass obliquely over the back. Of head coverings we find on *pl. 25*: *a*. Helmets. The Prussian Garde du Corps (*fig. 30*); Cuirassiers of the Guard (*fig. 29*); Dragoon Guard (*fig. 32*); Line Infantry (*fig. 41*); French Cuirassiers (*fig. 28*); Carbiniers (*fig. 31*). *b*. Shakos. The French Hussars (*fig. 33*); Chasseurs (*fig. 37*); Artillery (*fig. 38*); Line Infantry (*fig. 39*); African Light Infantry (*fig. 40*); the Prussian Hussar cap (*fig. 35*), that for the 1st Regiment of Body Hussars,* which bears as a distinction the silver death's-head.

5. Knapsacks and Belts. The manner of packing the clothing and necessities of the soldier in the field is seen by the knapsack of the French Line Infantry (*fig. 42*), of the Prussian Infantry (*fig. 43*), of the Prussian Artillery (*fig. 45*), and the Prussian Pioneers (*fig. 44*). Of belts and equipments, *fig. 60* gives the cartridge-box of the French Light Cavalry (right side) and the baldric and shoulder-belt of the French Light Infantry (left side); *fig. 34*, the sabretache of the French, and *fig. 36*, of the Prussian Hussars.

6. Drums and Music. *Figs. 46* and *47* are field-drums with brass shells and wooden hoops, painted in toothed chequer-work according to the colors of the cockade. *Figs. 48* and *49* are cavalry trumpets, *fig. 50* a bugle-horn, and *fig. 51* a trombone.

7. Colors and Standards. *Fig. 52* shows the French eagle, as it was in the time of the Emperor. *Fig. 53*, the Prussian eagle. *Fig. 57* is the color of the German Empire, of black, red, and yellow, cross striped, and with the black eagle of the empire in a yellow field in the centre; *fig. 55* is the German imperial standard, in black, red, and yellow, cross striped: both are trimmed with gold fringe and have cords and tassels of black, red, and gold. *Fig. 56* is the French color, blue, white, and red, striped perpendicularly, with blue, white, and red bands and gold fringe. Instead of a head the Gallic cock in gold is placed on the top of the staff. The French standard is precisely the same, only smaller (*fig. 54*). The English color (*fig. 58*) is of white silk, and has usually on one side the arms of England and the Star of the Garter, and on the other a laurel wreath, with the name

* Body (Leib) regiments in the German service are those regiments which are attached to the person of a sovereign prince.

of the battles in which the regiment bearing the color has distinguished itself. Cords, tassels, and fringes are of gold. There is here, however, the greatest diversity. The color of the United States of America is cross striped red and white, with gold fringe and tassels.

MILITARY GYMNASTICS.

Indispensable requisites for a good soldier are, great activity, precision, and dexterity in all his movements. The ordinary exercises, however, are entirely insufficient to effect this physical training, being directed principally to the carriage of the person, the motions in rank and file, and the management of the weapons. In order, therefore, to render the soldier agile and to increase his strength and muscle, the practice of gymnastics, upon which the Greeks and Romans formerly laid great stress, has now been made one of the objects of military instruction, and reduced to a species of system, as found most applicable to the wants of war service. *Plates 26, 27, and 28,* contain the principal exercises of military gymnastics.

The first exercises of gymnastics relate to the right positions of foot, knee, hip, shoulders, arms, head, and the whole body in place; to render the limbs movable and maintain the body in equilibrium; upon which follow the staff and ball exercises, to strengthen the muscles of the breast, arm, and spine. The wheeling exercises which succeed these have for object to maintain the good carriage of the body, once acquired, in all directions, and that the wheelings should be made rapidly and with precision; for which purpose the exercises are continued in advancing, marching, and running, as well in straight line as in zigzag and curve, singly and in rank and file. The next exercises are in leaping, partly free, partly with the leaping-pole, the leap in length, the leap in height, and the leap in depth, and then the swinging or vaulting. The leaps on to and over the vaulting-horse are divided into longitudinal and cross leaps, the first from behind, the last from one side. At first the effort is only to complete the leap by the assistance of the hand, afterwards without touching with the hands. One of the most remarkable leaps is the back leap (*pl. 26, fig. 6*), where the leaper clears the saddle by a running jump, resting both hands upon the cantles; in rising the legs are stretched wide with the toes pointed outwards, so that one leg passes over the crupper, the other over the neck of the horse, without touching him; the hands then let go the cantles, and the descent is made with the legs closed together, the back towards the horse. If it is desired to render the leap still more complicated, the half-turn can be made at the same time, bringing the face towards the horse in alighting. Very difficult also are the half and whole thief's leap. The half thief's leap (*pl. 26, fig. 7*) is made by a run directly towards the saddle, then at the distance of a half to two paces from it, springing up with the left foot alone, bringing the right shoulder by a turn directly over the middle of the saddle, the well extended right leg, with the toes pointed forwards, raised so high as to clear it entirely, and ending in the saddle. The right leg must not be

swung over the crupper, but must go directly forwards ; the hands are not rested and must not touch the horse, so that it is sometimes made holding at the same time one or two flags or muskets. In the full thief's leap, the spring is made also on the left foot alone, but in rising the right is brought up as well and the leaper passes entirely over the saddle, without touching it, and comes down on the other side of the horse. This leap also is made with flags or muskets, and the half turn can be made in it likewise, so that in alighting the face is towards the horse.

After vaulting come bathing and swimming, in which the soldier is practised not merely in the ordinary swimming and treading water, but also in swimming with the full equipment and carrying the weapons, in exercising and firing while in the water, in riding upon the swimming horse in rank and file, and is taught also how to proceed in rescuing persons from drowning.

So soon as these exercises are completed they pass to the beam on the ground, the balancing beam, and the hanging beam. The first exercises only teach the man to preserve his equilibrium, even under the most difficult circumstances, and not to lose at the same time the proper carriage of the body. But when the soldier comes upon the balancing beam, he is raised above the ground, and must, in the beginning, maintain his equilibrium by means of his outstretched arms, until after a time he learns to keep it with his arms folded, is even able to step over objects held in front of him, or to stoop down and remove things which are lying upon the beam (*fig. 1*), and at the end of the beam to turn round, or to go backwards and pass another person on the beam. Then follow exercises in balancing on one foot with the other hanging down (*fig. 2*), changing the feet and thus moving forward, and finally exercising with the musket upon the beam (*fig. 3*), which, of course, is placed higher and higher as the men acquire greater confidence. Last comes marching with the whole equipment upon the beam (*fig. 4*), at first when supported, and finally when suspended from ropes at each end of the hanging beam.

The exercises in climbing are very various. The men climb first upon a rope ladder with wooden rungs, then on the common rope ladder (*fig. 15*) carried obliquely to the beam ; this climbing is at first with both hands and feet, afterwards with the hands alone. Then come exercises upon the free hanging rope with wooden rungs inserted ; then on a rope which has only knots instead of rungs (*fig. 16*), and finally on the smooth rope (*fig. 17*) ; all of these exercises being made also with the hands alone, the feet hanging free. The final exercise in rope-climbing is climbing between two loose hanging ropes, using the hands alone (*fig. 18*), and on the rope stretched obliquely (*fig. 32*), in which, at first, to guard against accident, particularly where the climber is using the hands alone, an assistant is employed (*fig. 33*), who supports the climber by means of a rope passing over a roller. The same exercises are made also between two ropes stretched in the same manner. Then begins climbing on the ladder-pole, an upright pole through which rungs are inserted in the ladder form, or in a spiral line, and this leads to climbing on the smooth pole, of 5 to 7 inches in diameter (*fig. 19*), which

is grasped by the hands, one above the other, and at the same time between the calf of one leg and the shin-bone and ankle joint of the other. The beam elevated on posts is crossed by the climber, either sitting upon it, as on a horse (*fig. 28*), or crosswise (*fig. 30*), and moving forwards by the use of one or both hands; in this exercise the climber has two ropes, fastened to rings on a girdle round his waist and passing on each side of the beam to the ground, where they are held by two men, to support him in case he loses his balance (*figs. 29, 31*). These exercises can also be made hanging, or in other positions, as for example in *fig. 38*. Climbing on a ladder with movable rungs is a peculiar exercise. The ladder (*fig. 20*) consists of two ladder rails, which are grooved on the inner side, so that the rungs can be shoved up and down between the two rails; in the middle hangs a rope passing through holes in the rungs and having a knot for each rung to rest upon: the climber clasps the ladder-rails with his arms, and ascends the rungs with his feet by their assistance. The common ladder is mounted while standing obliquely, at first with both hands, then with the face turned outwards and the hands resting on the ladder behind the back, then only one hand is used, while something is carried in the other, and finally the ladder is ascended and descended without the use of the hands at all (*pl. 26, figs. 13, 23*). In this assistants are required at first (*figs. 14 and 22*), who keep hold of a rope, which passes over a roller and is fastened to the waist of the climber, before or behind, to preserve his equilibrium. These exercises can be variously modified; as, for instance, by two persons passing each other on the ladder; by ascending on the front and descending on the back; by overreaching one rung; by ascending and descending on the inside, and at last with the hands alone, the body hanging free in the air (*fig. 25*); or with hands and feet on the same rung at once (jumping). In all these last exercises an assistant is required at first (*fig. 27*), with a rope, which sustains in part the weight of the body, until the muscles of the arms have attained the necessary strength. To this class belongs also the mounting and descending a ladder carrying a load on the back and without the use of the hands (*fig. 24*) with the aid of an assistant (*fig. 26*). The last of the climbing exercises is mounting the perpendicular ladder (*fig. 21*) and descending on the other side, after passing round the ladder-rail at the top; this may be done also with the hands alone, after sufficient practice. The next exercise is climbing a wall by means of small orifices made for the purpose. In a wall openings are made six inches long and four high, and from six to eight inches distant from each other; the climber places his hands and feet in these alternately, and thus mounts or descends the wall (*fig. 40 g*). To these exercises belongs also the mounting a wall by means of the pyramid; the representation of this in *fig. 8* explains, better than words, how, by means of a pyramid of twelve persons, the thirteenth is brought in position to surmount the upper angle of a wall from twenty to twenty-two feet high; if the wall is lower then two, six, or more men are sufficient, as shown in *fig. 40 e, f*. It is necessary always to take care that in the lower stages only the strongest men are placed. *Fig. 40* shows the various applications of exercises in climbing to passing rivers and mounting walls. Narrow ditches are over-

leaped without assistance ; wider ones by means of the leaping-pole ; if still wider and there are strong beams to lay over them, they are crossed as in *a, a* ; if the beams are weaker, with the body in a horizontal position, as *b, b*, sitting aside or crosswise, as *c, c*, or a rope can be stretched across and fastened to a higher point on the opposite side, upon which men then clamber over, as at *d, d*. A wall can be scaled by means of the pyramid (*e, e*) of more or fewer men, according to the height (*ff, k*) ; or by the climbing-holes (*g, g*) ; or by the knotted rope (*h h*), or the rope ladder (*i i*). When the top is reached, the descent on the other side (*fig. 41*) is made by leaping down from small elevations, or else knotted ropes or rope-ladders are fastened to props or hooks, and the men climb or are lowered down by these.

CORPORAL EXERCISES. These are designed to give greater flexibility to the body ; they consist, first, of exercises in running and swinging with a rope, which fastened to an elevated point at one end is outstretched by the man who holds it at the other going backwards until he just touches the ground with his toes ; in this position the running in a circle and various other running and swinging exercises are performed. Another of these exercises is the swinging over a ditch or river ; a frame is erected on one bank of a height proportionate to the breadth of the stream (*fig. 5*), and in this a hook is fixed, from which hang two ropes ; the man who desires to leap over the stream steps upon a somewhat elevated platform (*fig. 9*), takes one of the ropes and holds it so that the end hangs loose over his back, while he grasps the rope with both hands outstretched and leans backwards as far as possible ; he then lifts his feet and thus leaves his standing-place (*fig. 11*) swinging pendulum-like forward to the other side of the obstacle, upon reaching which he lets go of the rope and goes on his way (*fig. 10*), the rope falling back again to the side whence he came (*fig. 12*). The second rope serves for another man.

Exercises of the bars and the horizontal pole form a very important part of these corporal exercises. The bar on which the first is made consists of two beams fixed upon posts not very far apart, and in such a manner that they can be raised or lowered according to the height of the exercisers. The exercises are various. The horizontal pole is a peculiar apparatus, which is represented on the right hand side, upper part, of *pl. 26*. Of the numerous exercises upon this we shall mention only the under-grip (*fig. 34*), in which the pole is grasped by the hands in such a manner that both thumbs are not turned to the same side, but away from each other and outwards, while the hands seize the pole on the outside and from below upwards ; in this position the hand-hang is practised. The knee-hang is shown (*fig. 39*), and can also be made with one knee while the other is swung over the pole or hangs below it. The hang-recumbent (*fig. 38*) is executed by seizing the pole with both hands and swinging the body forwards and upwards, passing at the same time the right leg over the pole, then dropping the hold with the left hand, slipping the right arm over the pole to the elbow, and so remaining suspended at length by the right elbow and right knee. The side seat (*fig. 35*) can be so executed that one hand is before, the other behind the body. From this position many turnings and

other exercises can be performed. The side-hold (*fig. 36*) is when both hands are rested upon the pole and the body sustained upon them with the face or back towards the pole; from this position draw-climbing, lifting, bracing, and winding are executed. When the man lifts himself by the side-hold and then turns slowly over backwards, without any violent swing (*fig. 37*), so that the balls of both feet come to the ground together, it is called the back-drop. There are various other exercises, the particular mention of which would occupy too much space.

FENCING. At first the science of fencing united both cut and thrust in one method, but as the art became more highly improved the two were divided, and each was taught and practised as a separate art.

The art of fighting by the thrust alone (fencing proper) teaches so to use the weapon, according to certain fixed and calculated principles, as to defend oneself from the attacks of an enemy with the small-sword alone and inflict wounds upon him. In fencing for practice the foil is used, for earnest the small-sword. This sword (*pl. 27, fig. 1 a*) consists of a blade (*b*) of the best steel, which is either two-edged (*a*) or three-edged (*c*); the tang which is inserted into the gripe is six inches long; the blade is divided (*fig. 2 b*) into four parts from the hilt (*a b*), namely, the forte, the half-forte, the foible, and half-foible, each being exactly $\frac{1}{4}$ of the blade. The hilt (*fig. 1 a*) has a stool, a cross-guard gripe, bow, and pommel. The German foil (*fig. 2 a*) is oblong in cross-section, and has a button at the point which is covered, and the gripe has a stool. The French foil (*fig. 3*) has instead of the stool a "*brille*" with fore-leather, or else only a cross-guard (*fig. 4*). The fencing-gloves (*fig. 5 a and b*) are on the outside of double leather and stuffed over the wrist, on the inside of thin single leather; for the teacher the gloves must be thickly wadded (*fig. 6 a and b*), and he has also, since the pupil must make all thrusts home, a plastron (*fig. 7*) of leather, upon which the aim for the thrust is marked right and left. The mask (*fig. 8*) is of strong wire and protects the face in practice. The extension of action is with the right foot forward and the right knee slightly bent, while the body rests upon the left leg, the knee of which is also slightly bent towards the left hand side; the left breast is turned away and the upper part of the body presented sideways to the antagonist; the right arm is easily extended holding the foil with the point on a level with the eyes of the opponent, the left arm is held up in a curved position so as to bring the opened hand about four inches higher than the head (*pl. 27, fig. 14*). This is the extension of guard. *Fig. 15 b* is the position of thrust; but the passage, a passing to the attack with the left hand, is shown in *fig. 23 a*. The passage can be made backwards also, to permit the lunge of the antagonist to pass by and then disarm him by a strong battement. The engagement can be made close, medium, and wide. The medium engagement is the most common (*fig. 14*), and in this the blades bind in the middle of their "*foible*," so that in the lunge the heart of the antagonist can be reached. The engagement, once taken, must be maintained even during the vaultings, when the place is changed in a circle to the right or left. The movements of the hand, from which the thrusts originate, are simple. The first, *prime*

(*fig. 10*) is the simplest and least fatiguing and forms the extension ; in the second, *seconde* (*fig. 11*), the little finger is above, the thumb below, the fingers on the outside ; the third, *tierce* (*fig. 12*), turns the hand in the quarter circle so that the fingers are below, the knuckles upwards, but the thumb directed inwards ; the fourth, *quarte* (*fig. 13*), is the reverse of the preceding. These motions must be industriously practised in rapid succession. The thrusts are either high (*fig. 9 a*) under the eye ; middle or chief thrusts (*fig. 9 b*) at the middle of the right breast ; or low (*fig. 9 c*) at the right side of the lower body above the hip. High thrusts are middle thrusts only with the point of the foil a little more elevated ; thrusts below the hip are irregular and generally forbidden. The thrust in prime is from the motion of prime (*fig. 15 b*), is seldom given, and serves more for extension, as it is not easy to thrust with the hand high and point low ; its mark is the breast, or for high prime the face. The thrust in *seconde* (*fig. 16 a*) divides into the *seconde inside*, which is made under the blade at the lower body, and the *outside seconde*, which is made at the same point but over the blade ; both are seldom delivered. The thrust in *tierce* (*fig. 17 b*), from the motion of *tierce*, must be delivered quick and strong, whereby the whole forte of your own blade engages the foible of your antagonist's ; it is delivered over the arm on the outer side of the opponent ; *tierce inside* is impracticable. High *tierce* aims at the face. The thrust in *quarte* is from the motion of *quarte*, and is the one most used. *Quarte inside* passes within the blade at the breast (*fig. 18 b*) ; high *quarte*, whether inside or outside, at the face. Low *quarte* aims at the lower body (*fig. 19 a*) and is given inside ; delivered on the outside it is called *quarte-reverse*, whereby one engages the whole foible of his opponent's blade with the whole forte of his own, presses it down, passes over it to the outside, or sometimes from the outside to the in, and then, with a turn of the wrist to the blade of the antagonist, thrusts at his side. The parades or parries are either flying or short, or stroke-parades, contre-parades, battements, and ligades. The short parades are : prime parade (*fig. 15 a*), made against prime and *tierce* ; *quarte inside* and *outside*, by a short pressure with the whole forte of the blade upon the whole foible of the antagonist's. *Seconde parade* (*fig. 16 b*) is a twisting of the hand from the prime-motion into the *seconde-motion*, and goes against *outside* and *inside seconde*. The *tierce parade* (*fig. 17 a*) is a twisting of the hand out of the prime into the *tierce motion*, and with it are parried *outside prime*, *tierce*, and *outside quarte*. The *quarte parade* (*fig. 18 a*) is a quick, strong turning of the hand from the prime motion to the *quarte motion*, whereby the arm must be stretched and ready for thrust. After the parade, however, the hand goes rapidly back to the prime position. With this parade *inside prime* and *quarte* are caught, while the hand at the same time is moved somewhat sideways ; also *tierce* and *outside quarte* by a slight pressure to the outside, and low *quarte* (*fig. 19 b*) by sinking the hand and point of the blade somewhat. All these are called stroke-parades, in which with the whole forte of your own blade you bind the whole foible of your antagonist's, then slide lightly up it to the forte, thus forcing it some distance out of direction. As by this means an open-

ing is at once made, so the after-thrust must immediately follow. Stroke-parade, however, must never degenerate into a blow, else you yourself leave an opening. Contre-parades arise when you go round your adversary's blade; a light stroke-parade may also be united with them. They are only in quarte, tierce, and seconde. The battement is a strong stroke-parade, with which an antagonist is usually disarmed if he do not hold his foil firmly, or at least an opening is made. There are quarte, tierce, and seconde battements, which are made from the corresponding motions, and parry the thrusts in the manner of the corresponding light parades. Ligades are battements in which at the conclusion you pass from one motion into another, and thereby twist your antagonist's sword from his hand, or at least force from him an opening, which you instantly make use of by an after-thrust.

In the teaching of fencing the blades are first engaged or bound, that is, in the prime-motion, laid softly against the blade of the antagonist, on the inside or outside. Then the thrusts and parades are shown and made, at first by "times," afterwards at will. The pupil is shown also how to pass from the parade to the after-thrust and the contre-parade. Next follow the feints. To feint is to make the mere show of a thrust, so as to mislead the antagonist into the parade and thereby obtain on the opposite side an opening for a real thrust. There are single, double, triple, and finally stroke-feints. The last consists in binding with the forte of your own blade the foible of your antagonist's, sliding briskly up that, making feint outside or inside, and passing instantly to the thrust for which an opening may present. Time and stop-thrusts are such as are given at the instant when the antagonist, purposing a thrust, makes too much or irregular preparation for it. An example of a stop-thrust (when the antagonist is permitted to deliver) is the following: If we perceive that our antagonist delivers his thrusts mostly over our arm, we wait for the moment when such a thrust is to follow (*pl. 27, fig. 20 a*), set the left foot, while the left knee is straightened as far back as possible, extend the right arm, twist the hand "en seconde," and so let the antagonist deliver (*fig. 20 b*), keeping down the head somewhat that the hostile thrust may pass over it. Counter-thrust is the application of all that has been taught at the discretion of the pupil, and shows whether he has understood it well or not. Hereby various artifices come in play. Thus, for example, instead of a battement or ligade one may disarm his antagonist when he has thrust tierce (*fig. 23 a b*), by making a passade with the left foot (stepping in) and seizing his wrist at the same time with the left hand, while with the blade in the right the hostile weapon is pressed down or battered. Or, when the antagonist has delivered in quarte (*fig. 24 a b*), bind the quarte thrust with counter-tierce, making the passade with the left foot, force up with the left hand the right hand of the opponent, and set your sword at his breast. Or the so-called theatre-thrust (*fig. 25 a b*), if the opponent thrusts en seconde, press with the flat of the left hand his blade away from your breast so that it passes by on the right, while your own blade goes round below it. The left foot makes the passade, the left hand forces up the opponent's right, his blade passing under your left arm and bringing up your own blade again, by a

curve, you thrust quarte. A parade-position for combatants is the following (*fig. 21 a b*): The opponent thrusts quarte, you let the thrust in, draw up the left foot to the heel of the right and take up the point of his sword with the flat of your left hand, while your right brings your own weapon under and across the forte of his, so that it can be forced into a curve. It is well in all cases for the teacher, in the beginning, to carry the blade of the pupil to its place. For example, the pupil delivers quarte, you let the thrust in (*fig. 22 a b*), draw up the left foot to the heel of the right, bring the left hand flat on the breast where the pupil's point should hit, and lay your blade under that of the pupil to give his hand the right direction.

Cut-and-thrust, a German exercise, teaches how to use a cutting weapon according to fixed rules deduced from calculation and experience, so as to defend yourself and injure your adversary. The weapon for this is the cut-and-thrust sword (or the broadsword), which is one or two edged, and broader and heavier than the small sword. For practice, the cut-and-thrust foil is used (*fig. 26*), having a blunt blade, and a bell guard and bow to the hilt. The blade is divided, as in the small sword, into forte and foible, and must be so proportioned to the hilt that the point of equilibrium lies about two inches from that. The fighting gloves (*fig. 29 a, b*) are provided with long gauntlets, are of double leather in the hand, and well stuffed, elsewhere of single buckskin; the gauntlets standing up around the wrists, must be of very thick buckskin, double, and not too wide. The mask (*fig. 28*) is very strong, of wire, and stuffed all around the frame. The fighting hat (*fig. 27*) has a brim four inches wide, which is drawn down at the sides by strings. The best extension is shown at *fig. 34 a, b*. The left foot stands perpendicular to the fighting line (the fixed foot), the right (step foot) about eighteen inches forward and from seven to nine inches out of the line. The right leg stands perpendicular, the left is stretched, and the weight of the body rests most upon this; the lower body is drawn back; the breast presented to the antagonist, the right shoulder a little advanced. The left arm lies, with the hand turned outwards, upon the back. *Fig. 31* shows the holding of the blade. The arm is raised stretched, until the hand is at the height of the shoulder; if the opponent is the tallest, the extension must be somewhat higher, and lower if the reverse. The point of the blade is opposite the opponent's right eye. Arm and blade must form a very obtuse angle, and the blade be always lightly bound with that of the antagonist. In the delivery, the step foot is set forward, but not slid; the giving back for defence also must be equally by a step. In cut-and-thrust fighting there are also vaultings and steppings in. The engagement is also threefold, close, medium, and wide; the medium (*fig. 34 a, b*) is that where the blades bind in the half foible, and by a moderate stretching of the arm the elbow of the antagonist can be reached; in delivery, his breast. The movements of the hand, or the motions, are: Prime, the back of the hand to the outside, the thumb above. Seconde, the back of the hand to the inside, the thumb under; the cuts from this motion are the most difficult. Tierce, the back of the hand uppermost; the cuts herefrom go to the right side. In quarte, the back of the hand lies underneath, and the cuts go to the left side of the opponent. As

to the cuts, you suppose yourself opposite the fist of the sword-arm of your opponent, and on the same level with this a middle point, to which all cuts are carried. If you desire to cut close and fine, then the circle for this middle point is small, and confined merely to the sword-arm of the antagonist (*fig. 31*). Then prime comes from *a*, seconde from *b*, tierce from *c*, quarte from *d*, steep quarte from *e*, steep tierce from *g*, seconde outside from *f*, and the inside seconde or Polish quarte from *h*. If, however, you imagine the central point upon the breast of your opponent (*fig. 30*), with the lines in the figure running through it, then you find there the same cuts, and if you conceive besides a horizontal line through the nose and another through the hips, then high tierce falls from *l*, and low from *m*, high quarte from *i*, and low from *k*. *Figs. 32 and 33* are frames upon which the cuts are delivered according to the above delineation, and towards which the pupil learns to give them in the air, before he is made acquainted with the parades, &c.

Prime (*fig. 35 b*) goes from the prime motion short to the sword-arm of the opponent; long, to his head. Seconde (*fig. 36 a*), cut perpendicularly upwards from the motion of seconde, goes short to the forearm, long to the upper arm of the opponent, and must be delivered by the stretched arm and wrist solely. Tierce (*fig. 37 b*), cut short, strikes from the tierce motion the right side of the sword arm, cut long, the right side of the body. Quarte (*fig. 38 a*), from the quarte motion, is exactly the reverse of the preceding. These four are the chief cuts. The middle cuts are: half or steep quarte (*fig. 39 a*), at the inside of the arm, short; from the left shoulder across the breast, long; the thumb lies sideways uppermost. Half outside seconde (*fig. 40 b*) falls upon the arm, cut short; from without, over the breast upwards; if cut long, a good after cut. The thumb lies obliquely downwards. Steep tierce (*fig. 41 b*), the thumb sideways upwards, and the hand in position of tierce. The cut goes steep to the right side, short upon the arm; long, from the right shoulder obliquely across the breast. Half inside seconde (*fig. 42 a*), the thumb obliquely down sideways, the little finger to the left outwards up. The cut falls, if short, from below upon the inside of the arm; if long, obliquely across the lower body towards the breast. Polish quarte (*fig. 43 b*), on the same line, is only distinguished from the preceding by coming from the motion of quarte. It is unhandy, and the most difficult cut. The four high and low cuts can only be cut long, and are: high quarte (*fig. 44 a*), from the quarte motion, but with the foible raised, from right to left through the face; low quarte (*fig. 45 a*), from the quarte motion, with the foible lowered, from right to left across the lower body; high tierce (*fig. 46 a*), from the tierce motion, exactly the reverse of high quarte; low tierce, from the tierce motion, exactly the reverse of low quarte. The parades (parries) are so made, that, to the cut of your antagonist, the forte of your own blade is always opposed, and the edge on the bow side, so as to receive the cut about half way between the bow and the end of the forte, and thus render it harmless. Prime parade (*fig. 35 a*) is given, without turning the hand, opposite to the cut, and then back to the extension. Seconde parade

(*fig. 36 b*) is given with hand advanced, so that the bow, with fingers directed downwards, is pressed down, and the blade turned, edge down, towards the antagonist's right side, wherefrom you go rapidly back to the extension. Tierce parade (*fig. 37 a*): the bow and the forte of the blade are pushed out of the extension a little towards the right; the foible remains upwards. Quarte parade (*fig. 38 b*) requires that the blade be so held, with hand laid back, that the bow comes on the inside, and the cut falls exactly in the angle of blade and basket. The point is directed towards the antagonist's right hip, the flat towards his breast. Steep quarte parade (*fig. 39 b*) is like the preceding, only the hand must be held higher, and a sharp counter cut made. Half outside seconde parade (*fig. 40 a*) is the seconde parade, but the guard is pushed somewhat to the outside. Steep tierce parade (*fig. 41 a*) is the tierce parade, but must be pushed upwards and outwards. Half inside seconde parade (*fig. 42 b*) is seconde parade, only the hostile cut must be met from within and underneath. Polish quarte parade (*fig. 43 a*) is so given, with the foible hanging down and the hand somewhat raised, that you can see your antagonist with your right eye through the angle of the bell and back of the blade. High quarte parade (*fig. 44 b*) is made from the quarte motion, with foible somewhat less depending, but must be strongly pushed forward. Low quarte parade (*fig. 45 b*) is the preceding, but more hanging, and sharper pushed. High tierce parade (*fig. 46 b*) is the chief tierce parade, only the bell is more sharply upwards, and you push sideways with the forte of the blade or the bow, whereby you see your antagonist under the blade. In low tierce parade the bell is pushed sideways and downwards to the right. After the teacher has shown the out or assault cuts, after cuts, and double cuts, he passes to the feints. Direct feints are those where the feint and the real cut lie opposite to each other; angle feints, where they lie perpendicular upon each other. In circle feints, the blade goes rapidly over the blade and then under the sword-arm of the antagonist, describes a circle therefore, and then delivers the purposed cut. Time or stop cuts are given in all positions of the hand, and fall at the same instant with the cut of the opponent, if in cutting he uncovers, or makes too much preparation. It is further to be remarked in time cuts, that the body turns away from the opponent as soon as he steps in (*pl. 27, fig. 47 b*), and consequently the right foot steps from its place, as much behind the left as it was before in front of it (*passade*). *Fig. 47 a*, cuts steep quarte "*a tempo*" in the *passade*. Vaultings are used in cut-and-thrust also, whereby the combatants in this movement describe a circle, the diameter of which is always an engagement. In right hand vaultings, the right foot, in short cutting, is set as far sideways as possible; in long cutting, forwards and sideways. The left foot must follow the right. In after cuts, however, the body is brought, by setting the left foot sideways, to extension distance behind the right foot. The right foot goes rapidly over to extension in the standing line of the opponent, or, vaulting wider, forward to a long or short after cut (*fig. 48, a, b*). After the pupil is finally taught to make the cuts out of succession, he passes to counter-cutting, where attack and defence alter-

nate, and feints, after cuts, double, and time cuts are applied at discretion wherewith the instruction terminates.

Fencing with the curved sabre must also be practised. To give the mere command of this weapon, these exercises must be made, first upon the fencing bench, as it is called, and afterwards upon horseback, as the movements of the horse have great influence upon the cuts to be delivered, since they change at every moment the position of the antagonists towards each other, and, therefore, the most effective cuts to be chosen. The extension with curved blades is like that for straight, yet the point, though at the height of the eye, lies over the shoulder of the antagonist, and each sees the other with the right eye over and through the angle formed by the two blades. Short after cuts and fine cuts proper are impracticable, because of the backward bent hilt, the curved point, and the gripe without bar; but all other rules for cut-and-thrust are applicable. The chief object of the cavalry soldier must be to gain, by turnings, wheelings, vaultings, &c., the left side of his opponent, and never expose his own. As soon as the man is properly practised in all that relates to the use of the sword on foot, he is permitted to make the cuts in the air on horseback, and, that he may accustom himself to give his blows a definite aim, a mark is set up for him, a head, for example (*pl. 28, fig. 2 a*), at which, first riding sharply up and short parrying (*fig. 1*), then riding past in full career (*fig. 2*), he practises the cuts. Then follows the combat between two men in the manner of counter-cut. The best plan here, is first to give the pupils, in lessons, a proper succession of cuts and thrusts, and make them deliver them at the word of command, before leaving them to deliver the cuts at their own choice. Examples of this are: *fig. 4 a*, steep tierce at the flying antagonist, who (*fig. 4 b*) turns backwards and parries tierce; *fig. 6 a*, steep quarte at the approaching opponent, who (*fig. 6 b*) parries steep quarte; *fig. 3 a*, steep tierce at the same when he is in the act of riding past you, whereby he parries steep tierce (*fig. 3 b*); *fig. 5 b*, prime, while riding past the left side of the antagonist, who parries prime (*fig. 5 a*), leaning over to the left. In the combat between lance and sabre, as the first is a thrust weapon, the rules of thrust fencing apply; but all the parades must be very strongly made and pushed forward, which can be done with the less hesitation, as there is no after cut to fear. On the side of the swordsman, however, the after cuts are very effective, as the lancer, after his thrust is parried, can seldom come into position quick enough to give a new thrust. Against the blow with the lance at the head, a very strong prime parade is employed. Lastly, the contest between cavalry and infantry is practised.

The cavalry soldier must further be practised with the lance. The lance, like the cut and thrust weapons, divides into the forte and the foible. The whole forte and the lower part of the lance are called also the queue. In the lance exercise, which must first be made on foot, the pupils are placed with great intervals between them. At the stepping in, the lance is held perpendicularly in the right hand, which lies, with the arm bent, at the height of the shoulder, the butt resting near the right foot (*fig. 7*). In the

ordinary position of the lance under the right arm, and the manœuvres with the same, the feet are placed about eighteen inches apart, the right foot a little advanced (*figs. 9, 10*); if the lance is brought over the left arm, however, the left foot is set forwards the same distance. The lance-present, as it is called, is made according to *fig. 8*, whenever the man exercises on foot. The usual position of guard, to which the man must always go back after having delivered a thrust, is with levelled lance. It lies then in equilibrium in the right hand, the queue brought directly under the right shoulder; the thumb lies above and outward on the right side of the shaft, the knuckles under. To make the thrust, the lance is drawn sharply back with the right arm, the hand turning it at the same time, so that the little finger comes uppermost and the thumb under; then the right arm thrusts the lance rapidly forwards at the point of aim upon which the eye is fixed, the arm extending itself to the uttermost, but so that the lance remains always under the right shoulder (*pl. 28, fig. 10*); the thumb comes uppermost as before, and the thrust being completed, the position of guard is at once resumed. In every thrust, the upper part of the body must stretch a little. To accustom the pupil to aim correctly, and deliver the thrusts with force, he is made to thrust at a leather ball or ring (*fig. 11^a*) suspended for that purpose, at first on foot and stationary, and then at all the various paces of the horse. The thrusts are practised in all directions: in thrusts to the rear the lance is turned in such a manner that the point comes behind and the queue in front, but this wheel-like movement of the lance must take place very quickly, that the lancer may return immediately to the position of defence; all parades (*parries*) are short blows upon the weapon of the assailant, after which the position of guard is instantly resumed, so as to be in readiness for a new thrust. To whirl the lance (*fig. 9*) it is swung over the head towards the left hand, so as to lie, with the point directed to the left, in line with the right hand and left upper-arm, the right hand grasping it firmly as before, close in front of the head, the man at the same time turning the head and upper-body in this direction, and then straight to the front. The lance is then swung in the same manner to the right, and brought, with the point to the rear, under the right arm, the head and upper body going at the same time to the left again; the hand hereby is brought to the front, but leaves this position and is turned, so that the thumb is to the front and right, and the fingers on the outside; the swinging to the left arm is then repeated, and the lance finally brought back to the position of guard.

In the combat of lancers with infantry, the bayonets of the latter come into immediate requisition, so that the infantry must be previously trained in all the movements, thrusts, and *parries*, which can here be employed. *Fig. 12* shows the extension and position of guard for the infantry soldier, to which he must always come back as rapidly as possible, whether he has left it for attack or defence. At first, the conflicts between lancers and infantry, divided into systematically arranged lessons, must be practised by word of command, and only after the men are thoroughly trained in these exercises can the counter-thrusting, as it is called, come in practice here

likewise; this demands, however, always the greatest caution, and must be done without passion, otherwise the instructor must immediately interpose. We add here a few explanatory lessons. 1. Engagement outwards (the musket to the left of the lance), the lancer (*pl. 28, fig. 18^b*) thrusts at the left side of the foot-soldier, who parries tierce (*fig. 18^a*), thrusts back, and takes the position of guard; the lancer (*fig. 17^b*) thrusts at the lower body or thigh of the foot-soldier, who parries seconde (*fig. 17^a*), thrusts, and "en garde." 2. Engagement inwards (the musket on the right of the lance): the lancer (*fig. 13^b*) thrusts at the right side of the foot-soldier, who (*fig. 13^a*) parries quarte, thrusts, and "en garde;" then follow thrust and parry as in *fig. 17^{a,b}*. 3. Engagement inside and outside, with disengagement. Lancer: engagement outside, disengagement and thrust to the left, at the right side of footman (*fig. 13^b*). Footman: quarte-parade (*fig. 13^a*), thrust, and "en garde." Lancer: engagement inwards, disengagement, and thrust to the right, at the left side of footman (*fig. 18^b*). Footman: tierce-parade (*fig. 18^a*), thrust, "en garde." Lancer: engagement outwards, disengagement, and deep thrust to the left, at the lower body or thigh. Footman: parry seconde, thrust, en garde. Lancer: engagement outwards, disengagement, and deep thrust to the right (*fig. 17^b*). Footman: seconde-parade (*fig. 17^a*), thrust, and en garde. 4. With swingings: Lancer: swing by the right upper-arm to the front, and thrust to the front (*fig. 15^b*). Footman: high-quarte-parade (*fig. 15^a*), thrust, and en garde. Lancer: swing under the right arm to the rear, and thrust right, backwards (*fig. 13^b*). Footman: quarte-parade, thrust, and en garde. Lancer: swing to the left upper-arm to the rear, and thrust left backwards. Footman: tierce parade and en garde. Lancer: swing under the right arm, and thrust to the front (*fig. 14^b*). Footman: high-tierce-parade (*fig. 14^a*), and en garde in the kneeling position (*fig. 16^a*). Lancer: thrust at footman's head (*fig. 16^b*). Footman: springs up with a yell (to frighten the horse), high tierce-parade (*fig. 14^a*), thrust, and en garde. The lessons in such manœuvres can be very much varied, the blows with the lance introduced into them, and finally the combat in the circle. The conclusion of the instruction is counter-thrusting, in which, without commands, the men engage each other by twos, and combat at their own discretion. Two footmen may engage one horseman, or the reverse.

TACTICS.*

The drilling of soldiers, or the training in rank and file, after they have,

* Throughout this treatise on tactics the word "*Zug*" is uniformly rendered by "company," that being the nearest equivalent most suited to convey a correct idea of the movements to an American reader. The word means, however, literally the eighth part of a battalion of four companies, according to the organization of the German armies, which is principally referred to in this treatise, and would thus be *half a company*, or, by our organization, a "platoon." In all the movements, however, it corresponds exactly with our "company," which is also the eighth part of the battalion proper. The words of command are also the German and not the American, though they are sometimes very nearly the same.

as individuals, attained the requisite dexterity and precision in their movements by gymnastic exercises, requires great attention, and every army, therefore, has its own system of instruction, according to which the necessary exercises are performed. As these systems differ essentially from each other, we can give here only a general outline of the principal evolutions.

The fundamental principle which must prevail in all movements and passings from one place to another is this, that every movement shall be effected in the shortest possible time and with the utmost possible simplicity ; the first, in order that the troops, when such movements are made under the enemy's fire, shall be exposed to it, inactive and defenceless, for the least time possible ; the second, in order to avoid that confusion, which, in complicated manœuvres under fire, only too readily arises.

The facings of single files in place are either quarter facings, to the right or left (right face, left face), whereby the man so changes his front that the new one is perpendicular to the old, or half-facings (about face), in which the man brings his face in the direction which his back had at first. Different armies require these movements to be made, either always to the right or always to the left. Between these principal facings come the eighth facings (right half-face, left half-face) and the three-eighths facings, right or left, the nature of which is given by the name. These facings are made in place and on the march alike. The manner of march (the pace) is different in different armies ; there are generally two distinct kinds, the parade step of 60 paces to the minute, and the double or quick step of 90 to 120 paces per minute ; in many armies, however, there is only a medium time of 100 to 105 paces per minute, and all quicker movements are made in a trot. In the American service there are three times or paces, viz. common time, 90 paces to the minute ; quick time, 120 paces ; and double quick time, 140 paces ; the last is a trot.

Where the troops are to be exercised in bodies the disposition in rank and file takes place. In rank the men stand so that each one can feel lightly the elbow of the file on his right and left ; this feeling (touch) is not to be lost even when on the march. The formation is either in two or in three ranks, so disposed that between each rank there is an interval of about three fourths of a yard, to give the rear men free space for their motions ; the men who stand one behind the other form a file. The company forms usually two platoons, rarely three, and the platoons are again divided into sections, which must contain not more than six nor less than four files. (In the American service the platoon is divided into two sections only.) On the right and left flank of each platoon stands an officer, and in rear of each a non-commissioned officer, who steps immediately into the officer's place whenever he loses it. The rest of the commissioned and non-commissioned are dispersed behind the platoons (file-closers), or, when sections are formed, pass to the flanks of these.

The direction in rank (dress) is attained when each file, keeping the shoulders square and without turning the head, can just see the breast of the second man on his right or left. When, however, the whole line is to take a new direction, this is done on particular objects (points). For this

purpose each company has an especial non-commissioned officer (marker), who carries a small flag (guidon, marker's staff). If the whole battalion is to take a new direction, the adjutant first establishes the markers at company distance from each other on the new line; then, at the command "Guides on the line!" the proper non-commissioned officers step forward for each platoon and establish themselves on the line; if then the new line is not more than four paces distant from the old, the men form themselves upon it by the command "Right" or "Left Dress!" but if the distance is more than that, then at the command "Dress!" the chief of each company gives the command "March!" and leads his company by the shortest line upon the new alignment.

Changes of front are effected either by the various facings of individual files or by evolutions of the whole together. When the line is faced about, the front rank, of course, becomes the rear and the right flank the left; in order, therefore, to maintain the proper position of the flanks and files, the countermarch must be performed (*pl. 29, fig. 1*). When the companies have made the about face, the sections will be in the order 8, 7, 6, 5, 4, 3, 2, 1, and the first rank will be the last; then the command "Left face" is given, and at the word "March!" the leading file of the second rank turns on his own ground to the right, while his rear-rank man, who is the leading file of the first rank, turns on him as a pivot until he fronts towards the new flank, maintaining the proper touch of elbow; then this file marches along the front, followed by all the other files in succession, each turning in the same manner on the same ground, until they arrive at 8, when the command "Halt, front!" is given, and the company has the position 1, 2, 3, 4, 5, 6, 7, 8, the first rank being in front and the flanks in their proper place. As this manœuvre would take too much time with a long line, it is made by sections or by platoons (*fig. 2*).

Another method of changing front in line is by wheels to the right or left. On the command "Left wheel!" the left file of the company faces to the left (*fig. 3*) and the rest of the line step out, so that each man on the march describes a circle, of which the left file is the centre. As soon as the company has arrived upon the new line of direction the command "Forward march!" is given, on which each man marches again direct to the front. By this method of course, the company, when the wheel is ended, has gained its whole breadth to the left; but if the wheel must be on the same ground, then it must be made on a centre pivot (*pl. 29, fig. 4*); in this case one half the company, here the sections 5, 6, 7, and 8, faces about, and at the word of command each wheels independently; when the new line is attained the command "Halt!" is given, the sections 5, 6, 7, and 8 face to the front, and the new alignment is established. Another species of wheel is "Shoulders forward!" which differs from the first in this, that the pivot man does not remain standing, but describes, taking very short steps, a small circle about the wheeling point (*fig. 34 at °*). In all the above described manœuvres, the men must take longer steps the further distant they are from the wheeling point, so that the line shall remain always straight. To the changes of front belong also the formations by file,

by means of which a position may be taken, without wheeling or counter-marching, which is either directly opposite to the first or perpendicular to it. The formation by file can be made, on the same ground, either forwards or backwards, but on the march it can be effected only forwards and from the march by a flank. It can be made from the front and flank forwards by the half-face, backwards by face and a half; the fogleman from whom the formation starts forms the base on which it is made. For the file formation on the same ground the command is, "By files right (left), march!" (*fig. 5*) whereupon the right (left) fogleman faces to the right, but all the rest of the files half-face to the right. On the command "March!" the fogleman remains halted, and the rest move forward in the direction of the half-face until they arrive on the new line (the dotted line in our figure), when they assume the touch and dress. This formation can be made by sections also (*fig. 6*). In our figure the formation is made to the left; the whole line faces about, section 1 makes a quarter wheel and then fronts. The other sections wheel on a centre pivot and march on the diagonal to the new alignment, where they halt, front, and dress on the 1st section. (In our figure, by an error of the engraver the numbers on the new (dotted) line are in reversed order, so that No. 1 comes where No. 8 should be, &c.) The file-formation backwards is made by the command, "By file right backwards march!" At this the right fogleman, who is the base of formation, faces to the left-about, the others make a face and a half to the right. At the word "March!" the fogleman remains standing, all the others step out; the rear rank file of the fogleman passes round him and establishes himself on the new alignment in his rear, the others pass over the shortest line on to the new direction, where they halt, front, and dress on the base which is already established in it, the second rank passing by files into the rear of the first. When the file-formation is to be made from the march by a flank, the leading file halts at the word "March!" the others make a half-face to the left and come up in the diagonal upon the new line, where they halt and dress upon the resting flank.

To put divisions of troops in march there is a great variety of methods. The march may be with unchanged front (forward march), or with altered front (march to the rear, oblique march, flank march); it can be with full front (front march), or with broken front (by companies, platoons, or sections). In the front march (battalion forward march in line of battle) the dress is always on the color, which with the color section is in the centre. The color and the officers, in this case, step forward and take the direction, while the whole line follow them. In the march to the rear in line of battle the whole line faces about, the color and officers pass to the front, and the march is made as before. The flank march is made only to the right or left, and when concluded the proper front is resumed.

The march with broken front is either by companies, platoons, or sections. The front is broken by the command: "By companies, platoons, or sections, right or left wheel!" If the march is to be made forward and from the right flank (*pl. 29, fig. 12*) then the command is: "By companies, right wheel; first company forward!" and at the word, "March!" the first

company moves direct to the front until it has gained company's distance, when it halts. Meanwhile each of the other companies has made the $\frac{1}{4}$ wheel to the right and halted. At the command, "March!" the first company moves forward, the second commences the wheel to the left, and as soon as it is completed moves forward, as shown at ¹ ²; meanwhile the third company has reached the wheeling-point, and wheels at the instant the second marches to the first, and so on in succession to the eighth. The movement is made from the left flank by the same means in reversed order and command. If after a march by companies the full front is to be formed again, the first company, if the march has been right in front, halts on reaching the designated alignment, the second company wheels at the same time to the left, and as soon as the wheel is completed comes right into line; with the commencement of this movement the third company has arrived at the wheeling-point, when it wheels to the left and then marches forward until it arrives opposite the left flank of the second company, which by this time is established on the line, when it comes right into line, as before, and so for each company in succession. If the march was left in front (*pl. 29, fig. 24*) the eighth company halts, and the movements already described are made by the others in reversed order and direction. If the march has been by platoons and it is desired to form companies (*fig. 15*), the second, fourth, sixth, and eighth platoons move in quick time left oblique to the side of their corresponding covering platoon, and if then the front is to be re-established the first company halts on the designated line, and the other companies do the same as soon as they have covered those in front of them; the first, second, and third companies then face to the right and march by that flank, until they are opposite their proper place in line, when they face to the left and come up on to it, the fourth company moving, as soon as uncovered, directly forward to its place. If the line is to be formed to the left of the point at which the column has struck it, the first company stands fast; the second, third, and fourth, as soon as they have covered, face to the left, march to that flank in the same manner as before, and come by the right face into line. If a bridge is to be crossed which is too narrow for the front of a company or platoon (*fig. 16*), the first section passes by the front, the second files round by the flank, perpendicularly to the line of the first, as at ⁵, and in this position crosses the bridge, as at ⁴; when the other side is reached it comes again into line with the first section by a file formation.

To the march with changed front belongs the march to the rear, the simplest form of which, by the about-face in line of battle, has been already described. *Fig. 13* shows a march to the rear in broken front and from the left flank. The eighth company makes a half-circle wheel to the left and thus moves direct to the front; all the other companies make at first only the quarter wheel, and the second wheel only on reaching the ground where the eighth has wheeled. The same movement may be made to the right. If the march was made by the about-face by companies from the left flank, so that the eighth company is leading and the rear-rank in front, then the line is re-established by counter-marching the companies,

which brings the ranks into place ; the eighth company establishes itself on the alignment, the seventh wheels to the right, and as soon as it is opposite the right flank of the eighth comes on the left into line, the other companies wheel on the same ground as the seventh, and come successively into line in the same manner. If the march was by platoons from the left, as in *fig. 24*, and it is desired to form companies in retreat, and present the full front again to the enemy, the manœuvre is as in *fig. 27*. Here the first rank is foremost, and would, therefore, by the subsequent formation be brought into the rear ; to avoid this the platoons are countermarched, then form companies according to *pl. 29, fig. 15*, establish the line of battle as shown by that figure also, and then the whole line is faced to the front.

Oblique marches are designed to move a direct line of battle over a diagonal, and are made with unbroken front by each file making the eighth face in the direction indicated by the leader, and then marching forward in that direction. If, however, an oblique front is to be moved in a parallel direction (*figs. 31 and 17*), then the front is broken into sections, which wheel inwards so far as to be perpendicular to the line of march, and then move direct to the front by sections* until the left flank of each comes upon the new alignment, when they halt and are wheeled into line. (Here also the engraver has reversed the number of sections in the new position.) If a line of battle, which with about-face has marched obliquely by companies from the left flank (*fig. 28*, the unhatched part), is to take a new position, with the front to the enemy and parallel, therefore, to the first, then points are established upon the new line, which being done the companies move by a flank in the proper direction on to it, and are there wheeled into line and fronted towards the enemy. If the new line, oblique to the line of march, intersects this (*fig. 29*), then the command "Halt!" is given, the points are established in the new line, part of the companies move by the right flank, the other part by the left upon this, and on reaching it are wheeled and fronted as before ; in this case, however, part of the companies (here the fifth, sixth, seventh, and eighth) must pass over the alignment until their left flank rests upon it.

The march by a flank, when not made with unbroken front by a face of the whole line, may be either in companies or platoons. In the march by the right flank (*fig. 10*) the companies or platoons wheel together to the right and then move off in column, the first in front. The line is re-established by the commands, "Halt!" and "Left into line, wheel!" In the march by the left flank (*fig. 11*) the wheel is to the left and the second platoon is in front ; the line is re-established by a wheel to the right. If the march is to be by the left flank, yet with the first company or platoon in front, then a kind of countermarch is made (*fig. 14*). All the companies wheel to the right ; on the next command, "March!" the first company wheels again a half-circle to the right, and then marches direct to the front along the former line. The other companies follow and wheel on the same ground as the first.

A column is formed so soon as the companies approach each other so closely that the distance between them is no longer the length of a company as usual, but at most one pace from the line of file-closers. The

column is formed, from the march to the flank, by the command, "Form column!" on which the first company halts and the others close upon it. In the United States service, as in the French, this restriction of the column is not received; the column is formed whenever the line is broken into companies, platoons, sections, or other subdivisions, placed one in rear of the other, and that which alone is here called the column is merely distinguished as the close column. A column of companies at platoon distance is called column at half distance.

If the column is to be formed from line of battle, it can be done on the first, last, or one of the inner platoons. To form column on the first company (*pl. 29, fig. 7*), the command is, "On right, into column; first company stand fast; right face!" whereupon all the companies, save the first, face to the right. On the word, "March!" all the other companies move by the right flank, obliquely one behind the other, into the rear of the first company. If the column is to be formed on the last company, however, the command is, "On left, into column; last company stand fast; left face!" whereupon all the companies, save the last, face to the left; and at the word "March!" move obliquely, one before the other, in front of the last company (*fig. 8*). To form the column on any other company (*fig. 9*) the command is, "Column on the centre; second (or other company), stand fast; right and left face!" whereupon the companies in front of the designated platoon face to the left, those in its rear to the right, and at the word, "March!" they move by the left and right flanks obliquely to the front and rear, and establish themselves before and behind the company which stands fast. To re-form the line of battle from the column of companies the deployment is practised. If the column was formed to the right (*fig. 18*) the command is, "Deploy by the left!" whereupon guides are established on the prolongation of the line of the first company, by which the new alignment is determined. On the further command, "Left face!" all the companies save the first face to the left, and at the word, "March!" move off by the left flank; as each company comes opposite its interval in line its chief commands, "Right face!" and marches it on to the alignment, when he halts and dresses it. If the column was formed to the left (*fig. 20*), the command is, "Deploy by the right!" upon which guides are established for the new alignment on the prolongation of the line of the last company; on the command, "Left face!" all the companies save the last make this movement, and at the word, "March!" move by the flank, opposite to their interval in line, where they face to the left again, move forward into it, then face about and dress. If the column was formed on the centre (*fig. 19*) the command is, "Deploy by the right and left!" Whereupon the guides in front of the platoon on which the formation was made prolong themselves to the right on the line of the first company, and those in rear of the company of formation prolong themselves to the left of this front line; at the command, "Right and left face!" the company of formation stands fast, the companies in rear of this face to the left, those in front of it to the right, and at the word, "March!" all move opposite to their intervals in line, the company of formation marching, as soon as uncovered, direct to the front on to this line;

the others establish themselves upon it in the same manner as before explained. Sometimes the column is formed to the left in such a manner that the first companies have faced to the left and established themselves in rear of the last (left in front), then the line of battle is re-formed by deployment to the right and coming into line by the right face. If a column, formed on the first company, is on the march to the rear, and is to be established on the alignment of the last company with the front to the enemy (*pl. 29, fig. 21*), the column is first countermarched by companies, then deployed by the right and with right face, but brought into line by the left face.

A column can change its direction in march by advancing the shoulders, the fogleman of the first company moving with short steps into the new direction, the other files conforming themselves to him by degrees. If, for example, a new alignment is to be established upon the first company, at an angle of 45° with the old (*fig. 22*), the first company moves on the command, "Left shoulders forward!" on to the new alignment which has been indicated by guides; as soon as the column has re-established itself again, covering the first company, the deployment is made by the left, and the companies brought into line by the right face. If instead of the eighth part of a circle the change of direction is to be the fourth part (*fig. 23*), the right hand fogleman of the first company makes a full face in the required direction, the guides are established to the left and dressed on him, the column is then faced and led by the flank upon the new direction.

In the passage of a defile or over a bridge when a new line of battle is to be formed to the front immediately upon emerging from the defile (*fig. 30*), one company (the fourth in this case) is marched by the front across the defile and established upon the new line, then the other companies face to the right and left and march by the flank, two at a time, through the defile, until their leading flanks come opposite to their place in the new line, when they establish themselves upon this by a file formation to the front on each side of the standing company.

The echelon order (*fig. 32*) is now seldom introduced; it consists in this: single companies are arranged one behind the other obliquely, like steps, while the principal part of the order of battle forms the proper front of attack. The echelon may be formed also from the centre, producing a kind of wedge-shaped order. *Fig. 34* shows on the left half in the hatched part a front of 6 companies in parade order, in three ranks, with the file-closers, &c., in the rear. The remainder of the figure represents the passing in review of these companies. After the parade is formed and has saluted, the command is given: "Pass in review; first company forward; by companies, right wheel, march!" upon which the captains pass to the front of their companies, and the flank officers or non-commissioned officers take their places. The first company marches direct to the point until it has gained company distance, the others wheel to the right, and then all halt. The guides (markers) are established at the wheeling-points as points of direction. On the command, "Parade, march!" the companies move direct to the front, only the second wheels immediately,

and the succeeding ones as they arrive at the same place. When the first company arrives at the second wheeling point it wheels again to the left until the command "Forward!" is given, and so with all the other companies. In passing, the officers and color salute, the men carry arms. *Pl. 29, fig. 6*, shows the change of direction by the shoulders forward, in which the fugleman on the left (the pivot file) describes with short steps a small circle, but in *fig. 5* the change of direction by a wheel, in which the left fugleman makes a face in the required direction, and then remains at a halt until the command, "Forward!" is given.

Fig. 33 shows the movements of an Army corps which forms, from its two lines of battle, columns of march by the left flank, two columns from each line; the first half of each line marching direct to the front, the other half making a double wheel at *d*, and then moving parallel to the first column. After completion of the march the new double lines of battle are re-established by means of opposite wheels at *e*.

The Artillery drill is very complicated, as in this the artillerists must be in great part converted into drivers, as with most armies the drivers are artillerists also. The pieces are manned, according to the weight of the ball they carry, with more or fewer persons. Thus: a 6-pounder requires six men; a 12-pounder, eight men for its service, including the drivers, non-commissioned officers, &c. *Fig. 35* shows the disposition of the men at a 12-pounder. At ⁶ stands a man who sponges and rams; at ⁷ the one who inserts the cartridge. For this purpose both step round the wheel near to the muzzle, and step back again when the piece is about to be discharged. The man at ¹⁰ has charge of the direction, in which he is assisted by ¹¹ and ¹², who move the trail to one side or the other at his signal, and he then prepares the piece to fire; the man at ⁹ touches off, and in heavy ground assists at the wheel in giving the direction. At the limber are two men more as reserve, and to assist in limbering and unlimbering, &c.; they also supply ammunition. At a 6-pounder only four men serve the piece, the man who fires assisting also at the trail handspikes to give the direction; there are two men at the limber employed as with the 12-pounder. The movements of a gun in changing place are very various. For very short distances the piece may be moved forwards and backwards by the men who serve it (*pl. 29, fig. 36*), those at ¹⁰, ⁹, ⁸, and ⁷ lay hold of the wheel-spokes, and the men of the reserve assist at the wheels likewise at ¹, ², ³, and ⁴, ⁵, ⁶, while at ¹¹ and ¹² two men heave at the trail with handspikes, to move it right or left, and thus guide the piece in the required direction. For greater distances bricoles are used, one or two for light pieces, two or four for heavier ones. *Fig. 39* shows a light gun which is being moved back with two bricoles; they are attached to the hooks for that purpose at the trail, and are manned by the troops, while two of those who serve the gun assist at the wheels. *Fig. 38* shows the same piece being moved forwards; here the bricoles are attached to hooks upon the washers of the wheels, and the piece is dragged forwards by the men, while two at the trail handspikes (¹¹ and ¹²) give the necessary direction. *Fig. 40* shows a heavy gun being moved with bricoles, backwards; here two bricoles are

attached at the cheeks of the trail and two at the wheel-washers, at which the men of the piece and the reserve draw. If the piece is to be transported to still greater distances, it is limbered up, as shown in *fig. 37*, where the crew distributing themselves about the gun move on each side of and parallel to it, those who serve the piece, at ⁷, ⁸, ⁹, and ¹⁰, as they stand at it; those from the trail at ¹², and ¹³ at the limber; the men of the reserve at the limber at ¹⁴ and near the horses at ¹¹; the non-commissioned officer near the horses at the head as leader. This drill is used by the English artillery; with the Prussian and French it is simplified, as with them only the prolonge is used, which is fastened either to the ring of the trail or to the breast-transom, and then for considerable distances the piece is moved not by its crew but by the limber at the end of the prolonge. For short distances the piece is moved always by hand as in *fig. 36*.

CASTRAMETATION.

Castrametation is a distinct branch of military science, and belongs to the department of the general staff officers. When a division of the army is to encamp, a suitable place is first sought for by proper reconnoissances; then a camp is staked out, and the tents carried by the train, or huts and bivouacs of material found on the spot, are set up by the persons detailed for that purpose. The tents are designed to contain each, either 8 infantry or half that number of cavalry, or else 16 infantry, or the same proportion of cavalry. *Pl. 29, fig. 41^a* shows the ground plan of the small 8 man tent; *fig. 41^b*, the elevation of the same. In the centre of the tent stands lengthwise a wooden frame, over which the tent is thrown, and whose ridge-piece forms the top of the same. The front wall is straight, and contains the entrance; the back is half round, or rather conical. At the bottom, the tent is fastened by means of tent pegs, on which a notch is cut, and which are driven through loops in the ground, as shown in the figure; a shallow ditch being dug around them to carry off the water. The tent for 16 men (*fig. 42 a, b*) is rounded at both ends, of double the size, and has its entrance in the middle of the side. For laying out the camp and setting off the right angles, the tracing line (*fig. 43*) is used; but a right angle can always be laid off very easily, by having in the measuring line four knots, which are six, eight, and ten feet distant from each other, by sticking a peg into the knot between six and eight, and then forming a triangle of six, eight, and ten, the angle at the peg six will always be a right angle.

As to the general form of encampment, *fig. 44* represents a camp of four infantry regiments, two cavalry regiments, and three batteries. The rectangle, *a, a, a, a*, 1410 paces in depth and 5872 paces (of two feet) in breadth, forms the line of the outermost posts. Then comes, 120 paces inside of this, the second line of posts, *b, b, b, b*, and again, at 120 paces from the front and two sides of these, on three sides therefore, the tents of the camp guard *c, c, c*. At *A, A, A, A*, is the camp of the four infantry regiments;

at B, B, lie the cavalry regiments ; at C and C, the light artillery ; at D and E, foot artillery ; and at F, the pioneer division and the pontoon and camp trains.

Fig. 45 is part of a camp for an infantry regiment of three battalions in the first line, with tents or huts for sixteen men each. In the part here represented lay four companies of the third battalion, the whole second battalion, and five companies of the first ; the remainder is left out to save space, but can easily be added. A, are the colonel's tents ; he has two assigned to him, one of which is used as an office and store-tent ; B, B, B, the tents of battalion commanders ; C, the lieutenant colonel's tent ; D, D, the tents of the men, which stand five paces distant from each other in breadth ; E, the wagon train ; a, regimental adjutant ; b, the administrative officers ; c, captains ; d, ensigns ; e, adjutants ; f, surgeons ; g, line of camp kitchens ; h, guard-house for the advanced posts of the camp guard ; i, sentry-box for the same ; j, hut for prisoners ; k, line of camp benches ; l, 1st and 2d lieutenants ; m, musicians ; n, battalion drummer and staff bugler ; o, laborers ; p, camp guard ; q, officer of this guard ; r, arm racks of the camp guard ; s, wagon master ; t, paymaster's chest ; u, arm racks of the camp piquets ; v, sutler's tent ; w, wash tent ; x, stand for the train horses ; y, soldiers of the train ; z, officers' horses ; bb, sinks for the men ; ee, sinks for the officers.

Pl. 29, fig. 46, shows the arrangement of a French camp for two infantry battalions, or rather two thirds of the camp of a regiment. The tents here are designed for eight men, and they are placed with their backs together, and the broad side towards the front of the camp, in order to give it less depth ; this brings the entrances upon the camp streets. The rows of tents are three paces distant from each other, and the camp streets are five paces wide. The letter references are exactly the same as in the preceding figure.

Fig. 47 is the camp of a French cavalry regiment of six squadrons, with huts for fourteen men each. The huts are so placed, that their entrances are on the camp streets ; the horses of each section are in one line, with their heads towards the huts, and fastened to the picket pole. The letters indicate different objects, as follows : O, the two huts of the colonel ; OL, the lieutenant colonel ; EC, chef d'escadron, or major ; RA, regimental adjutant ; AS, paymaster, adjutant, and ensign ; RC, regimental surgeon ; A, adjutant ; D, men's huts ; F, drivers of the train ; LL, lazaretto and hospital ; OF, officers' huts ; T, farriers ; UO, non-commissioned officers ; W, wagon master and laborers ; WP, quarter guard ; aa, line of camp kitchens ; b, smithies ; cc, place for forage ; ee, line of horses at the picket pole ; gg, men's sinks : the officers' sinks lie 160 paces in rear of the officers' huts. On the left of the figure in front of the encampment, the six squadrons are represented on parade as they have marched from their cantonments.

Around the encampment is thrown, as above mentioned, a chain of advanced posts, which are designed to observe any approach of the enemy at a distance so great, that before an actual attack can be made, the whole

camp is on the alert, and all the men ready for action. Such advanced posts are usually established in every case when, from any cause, the force is not in condition to form instantly in battle array, ready for assault, as in disembarkations, for example. *Fig. 48* shows such a disembarkation of French troops in Algiers. While the boats of the fleet are landing the soldiery, and these are assembling, a chain of advanced posts is immediately thrown out, who observe the field in all directions, and, opposing a slight resistance to any attempt of the foe, arouse the attention of the main body, which will thus be in readiness to beat back the assailants.

ORDERS AND BADGES OF HONOR.

The military service is one of sacrifice and privation, and many qualities are required from the soldier which are not nearly so indispensable for the civilian, such as courage bordering on contempt of death, devotion, perspicacity, presence of mind, endurance, and many other qualities seldom united in the same individual, and even with the best requiring some stimulus; recognition at least, when they appear in a remarkable degree and with striking effect; where they are wanting, or injurious qualities display themselves by the production of offences, admonition and punishment. The system of rewards and punishments for the military must therefore be a very elaborate one.

We shall here speak only of the rewards, which consist of promotions out of the regular order, and of personal distinctions by orders and tokens of honor. Orders are the most common means of reward, as the possibility of promotion is always limited, and by promotions out of the regular order others less favored by fortune are often injured. Every state has its own orders, and a great number of these, especially designed for distinction in military service, are represented on *Plates 30, 31, and 32*, which we will describe more in detail.

Austrian Empire. The Military Order of Maria Theresa (*pl. 30*, upper *figs. 1 and 2*) was founded by Maria Theresa as a reward for truth, bravery, and capacity in the military class, and for the honorable remembrance of heroes and heroism. Its foundation day is the 18th of June, 1757 (Battle of Kollin). The order has Grand Crosses, Commanders, and Knights. The insignia of the order are a gold white enamelled cross (*fig. 1*); in the centre shield is a silver beam on a red field, with the motto, *Fortitudini*, around it. On the reverse is the name-cypher, M. T. F. (Maria Theresa. Franciscus), enamelled in black upon a white field, surrounded with a laurel wreath. The Grand Crosses wear the insignia suspended from a hand-broad ribbon with three equal stripes of red and white, and passing *en echarpe* from the right to the left; the Commanders from a similar one, but narrower, and *en sautoir* (round the neck); the knights wear a smaller cross (*fig. 2*), at a narrow ribbon on the breast. The Grand Crosses wear besides a silver embroidered decoration upon the left breast, which displays the cross of the order resting upon a green laurel

wreath in a golden border. All members receive the rank of Knight in virtue of the Order, if they had it not before.

The Order of Leopold (*pl.* 30, upper *figs.* 6 and 7) was founded by the Emperor Francis I., on the 8th of January, 1808. It consists of Grand Crosses, Commanders, and Knights, and is bestowed also on civilians. The insignia of the Order are a gold cross, enamelled red, with white edges, having on the face the name-cypher, F. J. A., in a red centre shield, with the device, *Integritate et merito*, on the white border; and on the reverse, in an oak wreath, the Emperor Leopold's motto, *Opes regum corda subditorum*. Between the arms of the cross are golden oak leaves and acorns, and above it the Imperial crown. Grand Crosses wear the order *en echarpe* at a hand-broad, red silk, white bordered ribbon (*fig.* 6), and on the left breast a silver octagonal star, with the cross of the Order. This Order has also a collar, which is of gold, and consists of laurel wreaths and the intertwined letters F. and L., adorned with the Imperial crown. The Commanders wear the cross at a narrower ribbon, and *en sautoir*; the Knights at a narrow ribbon on the breast (*fig.* 7).

The Order of Elizabeth Theresa (*fig.* 3) is called also the Military Foundation of Elizabeth Theresa. It was founded in 1750 by Elizabeth Christina, the widow of Charles VI., for twenty Knights, and may be given to persons of any nation or religion. The badge of the Order is an oval, octagonal, red and white star, with a golden border, beneath the Imperial crown in gold. The white central shield displays, under the golden Imperial crown, the name-cyphers E. C. and M. T., and around them the device of the Order: *M. Theresia parentis gratiam perennem voluit*. The order is worn round the neck with a narrow black ribbon. The Catholic Knights must pray daily three Pater Nosters and three Ave Marias for the founder. The Lutheran must pay three ducats yearly to the Invalid Institute.

The Order of the Iron Crown (*figs.* 4 and 5) was founded by Napoleon in 1805, and confirmed by the Emperor Francis on the 12th of October, 1815. It is bestowed upon civilians also, consists of three classes, and has twenty Knights of the first, thirty of the second, and fifty of the third class. The Knights have, for all occasions of ceremony, an order dress in the style of the middle ages, of yellow, blue, and white, with gold fringes and embroidery. The badge of the Order is an imitation of the iron crown, under a golden, imperial, crowned double eagle, who bears upon his breast a blue heart-shaped shield, with the cypher F. Knights of the first class wear the order with a broad gold-yellow silk ribbon (*fig.* 4) with dark blue border, *en echarpe* from right to left, and besides, on the left breast, a silver octagonal star, upon which is a round gold shield with the iron crown. The shield has a blue border with gold edge, and the device of the Order: *Avita et aucta*. The gold collar consists of the letters F. P., the iron crown, and an oak wreath alternately. Knights of the second class wear a somewhat smaller badge at a narrower ribbon, *en sautoir*, and those of the third class one still smaller on the breast (upper *fig.* 5).

The Metal Cross of the Army (*figs.* 8 and 9) the Emperor Francis I. founded on the 31st of May, 1814, at Paris. It was given to all who had made

the campaigns of 1813 and 1814, and consisted of a four-cornered cross, with a green oak wreath, coined from captured gun metal, having on one side the inscription : *Grati princeps et patria. Franc. Imp. Aug.*, and on the other : *Europæ libertate asserta*, MDCCCXIII. MDCCCXIV. It is worn on the breast from a ribbon having three stripes of black and yellow.

The Medal for Military Bravery (upper *figs.* 10, 11, 12, 13) was established by the Emperor Joseph II., and designed for the troops, from the sergeant major and sergeant downwards. It had at that time two classes. The first (*fig.* 10) consisted of a golden medal (\$17 75 value) at a red ribbon, the second (*fig.* 11) of a silver medal (75 cents value) at a red and white cross-striped ribbon with red and white border. Francis I. constituted the medal anew ; it is now worn at the breast from the same ribbon as in the second class before, and is cast in gold and silver (*figs.* 12, 13), displaying on one side the Emperor's bust, and on the other a laurel wreath and color, with the legend : *Der Tapferkeit* (to bravery).

Kingdom of Prussia. The Order of the Black Eagle (*pl.* 30, lower *figs.* 1, 2, 3) was founded by King Frederick I. of Prussia, on the 18th of January, 1701, and is the first order in the state. It was to have originally, besides the sons and brothers of the reigning king (who were born Knights of the Order), only thirty Knights, who must be at least thirty years of age, or, if princes, of the age of confirmation, usually 14 years. The badge of the Order consists of a gold, blue enamelled Maltese cross, on the central shield of which is the cypher F. R. In the angles of the cross are four black eagles with spread wings. The cross (*fig.* 3) is worn from a hand-broad orange colored silk ribbon, *en echarpe* from left to right. There belongs to it on the left breast, a silver embroidered eight pointed star, with a round centre shield, in which, on an orange colored ground, is a flying black eagle, having a laurel wreath in one claw and a thunderbolt in the other. The white border bears, in gold, the device of the Order : *Suum cuique* (*fig.* 1). Subsequently the knights had a peculiar Order costume, and a collar (*fig.* 2), which was composed of black eagles with thunderbolts, and round shields set with four crowns. The shields were blue, with golden borders and white centre fields, with the device of the Order. On the blue ground stood four times the name-cypher TF. R. At present the collar is borne only at royal obsequies and as heraldic decoration, and the number of knights is unlimited. They are at the same time Knights of the Order of the Red Eagle of the first class, and wear it round the neck.

The Order of the Red Eagle (*pl.* 30, lower *figs.* 4 and 5) George William instituted in 1705, when he was yet hereditary prince of Baireuth, and confirmed on his accession to the throne in 1712. It was regenerated on the 18th of January, 1810, and divided into three classes. The insignia of the Order (*fig.* 4) consist of a gold, white enamelled cross ; in its round white centre shield soars, on the face, the crowned red eagle with the Hohenzollern escutcheon (quartered black and white) on the heart, and a laurel branch in the claws. On the reverse is the name-cypher F. W. on a white ground, with a crown. The cross is the same for all classes, only of different sizes. Knights of the first class wear it from a broad silk ribbon,

white, with orange border, *en echarpe* from left to right, and with it, on the left breast, a silver embroidered eight pointed star, whose centre shield is like that of the Order cross, and has the superscription : *Sincere et constantier*. Where the knight has been previously of the second and third classes, oak leaves are added to the insignia. Knights of the second class wear the badge of the Order, *en sautoir*, from a narrow ribbon, and the oldest knights a four pointed silver embroidered star, worked with the full insignia of the Order, on the left breast. Knights of the third class wear a small cross, from a narrow ribbon, on the breast. On the 18th of January, 1830, the fourth class of the Order was founded, to take the place of the Merit medal. The badge is of silver instead of enamelled gold (*fig. 5*). Knights of the third class who have had the fourth, wear the third with a bow.

The Order of Military Merit (*fig. 7*) was instituted in 1665 by Prince Charles Emilius, under the title, *Ordre de la Générosité*. Frederick II., on his accession to the throne in 1740, changed that name to its present one. The badge of the Order is a blue enamelled Maltese cross, whose upper arm bears the letter F under a crown, and the three other arms the inscription : *Pour le mérite*. In the angles of the cross are golden eagles with outspread wings. The cross is worn, *en sautoir*, from a black silk ribbon with silver border. Extraordinary merit adds oak leaves to the order, and a second silver stripe to the border. Of this Order there is a peace class also for civil merit.

The Order of St. John (*pl. 30*, lower *fig. 6*). After the old commanderies of the Order of St. John, Brandenburg, and the Mastership of the Army were done away with in 1810 and 1811, the new Order of St. John was founded on the 23d of May, 1812, as an order of merit, but principally as a token of favor, given, however, only to nobles (without proof of ancestry). The badge of the Order is a white enamelled Maltese cross, in the angles of which are crowned black eagles with outspread wings. The cross is worn by the knights, who form but one class, *en sautoir*, from a black watered silk ribbon. On the left breast is worn a simple white Maltese cross. The Order has a peculiar state uniform.

The Iron Cross (*figs. 9 and 10*) was instituted on the 10th of March, 1813, for those who had rendered effective service to the fatherland. The cross continues by inheritance in the regiment, so long as any deserving persons remain in it who took part in the campaigns of 1813 and 1814. The Order has two classes. The cross is of cast iron, with silver border, and bears the name-cypher F. W. under a crown, three oak leaves, and the date, 1813 (*fig. 9*). Military men wear it from a black ribbon with white border; civilians, from a white ribbon with black border (*fig. 10*), both on the breast. Knights of the first class bear, in addition, a simple black, silver bordered cross, as a star, on the left breast. There were also some Grand Crosses (Blücher, for example), who wore the cross twice as large, *en sautoir*. This Order is now gradually dying out, as it was bestowed only in 1813-14.

The Medal of Military Merit (*fig. 8*), instituted in 1793 by Frederick

William II., was for non-commissioned officers a gold, for privates a silver medal, which had on one side the name-cypher of the king with the date 1793, on the other, in a laurel wreath the words, *Verdienst um den Staat* (Service to the State), and was worn on the breast from a black ribbon. Since 1814 this medal has been changed for a silver cross (as *fig. 5*), is called Military Decoration of the first class, and is worn from the ribbon of the Iron Cross.

The Medal for 1813–14 (*fig. 11*), instituted in 1813, by Frederick William III., for all the military who had served without reproach against the enemy in 1813–14. The medal has on one side, under the crowned name-cypher F. W. the inscription, *Preussens tapfern Kriegerern* (Prussia's brave warriors), with the circumscription, *Gott war mit uns, ihm sei die Ehre* (God was with us, to him be the honor). On the other side is a cross upon rays, in whose centre, within a laurel wreath, is the date 1813, 1814. On the edge are the words, *Aus feindlichem geschütz* (from the enemy's guns). The medal is worn upon the breast from an orange ribbon with black and white border. Non-combatants received iron medals with the inscription, *Für Pflichttreue im Kriege* (for faith in war), the king's cypher and the circumscription, *Gott war mit uns, ihm sei die Ehre*. These medals were worn at the breast from a white ribbon with black and orange border.

Kingdom of Bavaria. The Military Order of Max Joseph (*pl. 31, fig. 1*) consists of three classes, Grand Crosses, Commanders, and Knights, and was instituted by Maximilian Joseph I. in 1806, out of the Military Decoration established by the Elector Charles Theodore in 1797. The Order carries with it pension and personal nobility; if the father and grandfather have had the order, that constitutes a nobility of descent. The badge of the order is a gold, white enamelled, Maltese cross, with a gold crown. Upon the blue enamelled centre shield is, on one side, the name cypher M. K., on the other side the motto of the order, *Virtuti pro patria*. Between the points, each of which has a gold ball, are golden rays. The order is worn by Grand Crosses from a hand-broad, black silk ribbon with white and blue border, *en echarpe*, from right to left, and in addition, on the left breast, a silver eight-pointed star, embroidered with the badge and device of the Order. Commanders wear the order *en sautoir*, and Knights a somewhat smaller one from a narrow ribbon at the breast.

The royal Order of Louis (*fig. 2*) was instituted by Louis I. in 1827, for fifty years' service, years of campaign being reckoned double. The badge of the Order (*fig. 2*) is, for persons who have the rank of officers, a gold cross surmounted by the royal crown, having on one side the inscription, *Ludwig König von Baiern* and the bust of the founder in gold upon a white ground; on the other side, surrounded by a green oak-wreath, the words *Für ehrenvolle funfzig Dienstjahre* (For fifty years' honorable service). The four arms of the cross bear the inscription, *Am 25. Aug. 1827*. Knights under the rank of officer receive a gold medal with the same inscription. This order is worn, from a deep red ribbon with light blue border, at the left breast.

The Military Medal of Honor (*fig. 3*) was established by Max Joseph in 1794, for the military, from the rank of sergeant major and sergeant downwards, who had distinguished themselves by bravery, and was distributed in gold and silver. The silver medal brought the possessor an addition of half, the gold medal of full pay, which remained to them even in case they passed afterwards into the rank of officer. The medal displays on one side the bust of the founder, on the other the royal arms, held by a lion armed with a sword, and the circumscription, *Der Tapferkeit* (to bravery). The medal is worn upon the breast, from a black ribbon with white and blue border.

The Decoration of the Army Hospital Corps (*pl. 31, fig. 4*) was established in 1812, by Max Joseph, for the surgeons who had been particularly efficient in the field hospital and on the field of battle. The decoration consists of a gold or silver medal, which has on one side the bust of the founder, and on the other, in a laurel-wreath, the inscription, *Ob milites inter prœlia et arte et virtute servatos*, and is worn at the breast from a black ribbon with white and blue border.

Kingdom of Saxony. The Military Order of St. Henry (*fig. 5*) was founded on the 7th November, 1736, at Hubertusburg, by King Augustus III., for military merit; in 1829 it received new statutes from King Anthony. It consists of Grand Crosses, Commanders of the first and second classes, and Knights. The badge of the Order is a gold Maltese cross with white enamelled border. In the centre is a white enamelled round shield, and in this the Emperor Henry, standing, in full costume, and the letters S. H. In the blue border stands, *Frid. Aug. D. G. Rex Sax. instauravit.* The reverse displays, in the central field, the arms of Saxony, and in the blue border the words, *Virtuti in bello.* The four angles of the cross contain parts of the Saxon lozenge-crown. This badge is of three sizes. Grand Crosses wear it from a hand-broad sky-blue ribbon with yellow border, *en echarpe*, from right to left, and on the left breast an octagonal star of gold rays, in whose centre is the round shield of the cross (Emperor Henry), with the circumscription *Virtuti in bello* on a blue ground. Commanders of the first class wear a smaller cross, *en sautoir*, and the star, but of smaller size (3 inches), on the breast; Commanders of the second class only the cross. Knights wear the smallest cross, from a ribbon 1½ inches broad, at the breast. The Knights advance through the classes. A fifth class of this Order is formed by

The Medal of Military Merit (*fig. 6*), established in 1796, for non-commissioned officers and privates. This is given in gold and silver, displays on one side the bust of the founder, and on the other, in a laurel-wreath and flag, the words, *Verdienst um das Vaterland* (Service to the country), and is worn at the breast from a ribbon one inch wide, sky-blue with yellow border.

Kingdom of Hanover. The Guelphic Order (*figs. 7, 8*) was founded in 1815 by George IV., at that time Prince Regent of England, and was then divided into three classes, Grand Crosses, Commanders, and Knights. The badge of the order is a Maltese cross of dead gold with polished edges, set

with balls at the points ; in its angles, four golden lions passant. In the centre of the cross lies a round, red shield, bearing the white horse of Brunswick. The shield is surrounded with a blue border, which contains the device of the order, *Nec aspera terrent*. Around this blue border lies, for civilians an oak, for military a laurel-wreath, in gold. On the reverse is, in a red field, the name-cypher "G. R." with the royal crown, and in the golden border the date MDCCCXV. Above the cross is the Hanoverian crown, and, for the military, between the cross and crown two crossed swords. The cross is the same for all classes, but of different sizes. The Grand Crosses wear it from a broad light-blue ribbon, *en echarpe*, from left to right, but on gala days about the neck, from a golden chain composed of lions, royal crowns, and the cypher G. R. alternately. On the left breast is a silver eight-pointed star of forty straight and eight twisted rays, and on this the central field of the order, which, for military, rests upon two crossed swords (*pl. 31, fig. 7*). Commanders wear a somewhat smaller order, *en sautoir*, from a narrower ribbon, and on the left breast the badge of the Order embroidered in silver, but with the central shield in its appropriate colors. Knights wear the smallest cross (*fig. 8*), at the button-hole, from a ribbon $1\frac{1}{2}$ inches wide. For non-commissioned officers and soldiers there is the Guelphic Medal, which resembles the Waterloo Medal (hereafter to be described), but is worn from the ribbon of the Guelphic Order as a particular class of that Order. In the year 1841 two classes more were instituted in this Order ; Commanders of the second class who do not bear the star on the breast and the holders of the Silver Cross (fifth class) for whom the order is entirely of silver, but the central shield in its proper colors, and bearing instead of the cypher G. R. the cypher E. A. R. (Ernest Aug. Rex.) The Waterloo Medal (*fig. 9*) was established in commemoration of the 18th June, 1815, for those who had taken part in the battle of Waterloo. It is of silver, and displays, on one side, the bust of the founder (Prince Regent George IV.) with the date 1815, and on the other, in a laurel wreath and under a trophy, the inscription, *Waterloo, June xviii. with the circumscription Hannoverscher Tapferkeit* (to Hanoverian bravery). The medal, which bears also the name and office of the possessor, is worn at the breast from a crimson ribbon with sky-blue border, and was sent also to the heirs of those that fell at Waterloo as an honorable memorial.

Kingdom of Wirtemberg. The Order of Frederick (*fig. 10*) was founded by the present King William, in 1830, for civil and military desert, and has only one class. The badge of the Order is a gold, white enamelled cross, with golden rays between the arms. The golden central shield, surrounded with a blue border, displays the bust of King Frederick, and on the blue border the circumscription, *Friedrich, König von Würtemberg*. On the reverse the central shield is white enamelled and has in gold the inscription, *Dem Verdienste* (To merit). On the blue border stands the motto of King Frederick, *Gott und mein Recht* (God and my right). The order is worn from a broad, royal-blue ribbon, *en echarpe*, from right to left, and on the breast the badge of the Order, embroidered in gold and silver, with the

motto, *Gott und mein Recht*, on the blue enamelled border. The order confers personal nobility.

The Order of Military Merit (*pl. 31, fig. 11*) was founded by Charles Eugene of Wirtemberg in 1759, and reorganized in 1799, 1806, 1816, and 1818. It consists now of Grand Crosses, Commandators, and Knights. The decoration, which is alike for Grand Crosses and Commandators, but smaller for Knights, consists of a golden, white enamelled cross, with a central shield of the same, having on its face a green laurel wreath, with the words *Furchtlos und treu* (Fearless and faithful) in the blue border; on the reverse the king's cypher W., inclosed by a blue border bearing the motto of the face. Over the cross is a double notched crown of gold. The order is worn, by Grand Crosses and Commandators, *en sautoir*, from a dark blue silk ribbon; by the Knights, whose cross has no crown, at the breast. Grand Crosses have also, on the left breast, the cross of the Order embroidered in silver, on which the enamelled central shield of the face is found. For non-commissioned officers and privates there is a gold and silver medal at the same ribbon.

The Military Decoration, for Officers, Non-commissioned, and Privates (*fig. 12*), was established in 1833 for officers of 25, non-commissioned officers and privates of 20 years' service. This decoration is an eight-pointed cross, whose central field contains within a laurel wreath the letter W. Officers bear it in gold, non-commissioned and privates in silver, from a deep red, blue-bordered ribbon $1\frac{1}{2}$ inches wide, at the breast.

Grand Duchy of Baden. Charles Frederick's Military Order of Merit (*figs. 13 and 14*), founded in 1807, by the Grand Duke Charles Frederick, has three classes, Grand Crosses, Commanders, and Knights. The badge of the Order is of three different sizes, and consists of a white enamelled Maltese cross surrounded with a laurel-wreath, beneath a golden crown (*fig. 14*). On the face is a red central shield, in which is the name-cypher of the founder in gold, surrounded by a blue ring, with the circumscription, *Für Badens Ehre* (For Baden's Honor). The reverse has a similar shield with like border, upon which, in a field of dead gold, is displayed a silver griffin ready for fight, holding a shield with the arms of Baden in the left, and a sword in the right claw. The order is worn from a red and yellow striped ribbon by Grand Crosses, *en echarpe*, from left to right; by Commanders, *en sautoir*, and by Knights, at the breast. Grand Crosses and Commanders (if generals) bear upon the breast a silver star (*fig. 13*), with four principal rays, and four smaller intermediate rays, the central shield of which is like that on the reverse of the order.

The Military Merit Medal (*fig. 15*) was established at the same time with the Order of Charles Frederick, and is designed for non-commissioned officers and privates. It displays on the face, in gold or silver, an armed griffin, holding in the left claw a shield with the oblique bar of Baden and a sword in the right and the circumscription, *Für Badens Ehre*; on the reverse, the inscription *Dem Tapfern* (To the Brave), and beneath, the name of the bearer. The Medal is worn from the narrow ribbon of the Charles Frederick Order. The holders of the silver medal have an addition

of half, those of a gold medal of full pay, which after they leave the service remains to them as a pension for life.

Electorate of Hesse. The Military Merit Order (*pl. 31, fig. 16*) was founded in 1729 by Landgrave Frederick II. and organized anew in 1820. The Order has only one class. The badge of the Order is a gold, pink enamelled Maltese cross, in the angles of which are crowned lions of gold. The face displays, in the upper field of the cross, the name-cypher W K, in gold, and in the other three fields the inscription, *Virtuti*. The reverse is smooth. The cross is covered with a royal crown, and is worn *en sautoir* from a sky-blue ribbon with white pearl woven border.

The Medal of Honor and Remembrance (*fig. 17*) the Elector Wilhelm II. instituted on the 14th of March, 1821, for the warriors who had made with him the campaigns of 1814 and 1815. This is, for combatants, of gun-metal, for non-combatants, of cast iron. The face bears, in a laurel wreath, the inscription, *K. W. II. seinen tapfern Hessen* (to his brave Hessians), 1821, and the reverse, a cross resting on an oak wreath, with the circumscription, *Gott brach des Feindes Macht und Hessen war befreit* (God broke the enemy's strength and Hesse was freed). Upon the cross lies a laurel wreath, over which stands a knight's helmet, and in the wreath the dates 1814, 1815. Combatants wear the medal from a blue, red-bordered ribbon 1½ inches wide; non-combatants from a white ribbon red-bordered.

Grand Duchy of Hesse. The Military Service Decoration (*pl. 31, fig. 18*) was established on the 26th December, 1833, by the Grand Duke Louis II., and consists, for officers, of a gold, for non-commissioned officers and soldiers, of a silver cross, on the face of which is an L with a crown; on the reverse, the words, *XXV Jahre treuer Dienste* (25 years of faithful service). The cross is worn at the breast, from a crimson ribbon with white borders. In bestowing it years of campaign count double. For fifty years' service the cross receives curved corners, a crown, and instead of the XXV the figure L.

The Field Service Token (*fig. 19*) was instituted 14th June, 1840, for all those who have made a campaign in the Hessian service, and consists of a bronze medal, having on its face an L with a crown and the inscription, *Gestiftet am 14 Juni, 1840* (Founded 14th June, 1840); on the reverse, the words, *Für treuen Dienst im Kriege* (For faithful service in war). The medal is worn from a crimson ribbon with white borders.

Grand Duchy of Saxe-Weimar-Eisenach. The Order of the White Falcon (*fig. 22*) was founded in 1732 by Duke Ernest Augustus, as the Order of Watchfulness, and renewed in 1815 by the Grand Duke Charles Augustus. It consists of three classes, Grand Crosses, 25 Commanders; and 50 Knights. The badge of the Order is a golden, white enamelled falcon, upon a golden, green enamelled Maltese cross. In the angles appear four red points, white enamelled at the ends. On the reverse the cross is white, the points green enamelled. In the centre is a blue enamelled shield with the motto *Vigilando ascendimus*, bordered with a gold laurel-wreath, with armatures for the military, and covered by a gold crown. Above the star is a crown-royal of gold. Grand Crosses wear this Order from a broad, deep red, silk ribbon, *en echarpe*, from right to left, and also a silver, eight-

pointed star, on which lies the green cross of the order, with a gold central shield in which the falcon appears. The central shield has a circular blue border, with the motto, *Vigilando ascendimus*. The order has also a golden collar, which is composed of golden falcons and the name-cyphers E. A. and C. A. The Commanders wear the order *en sautoir*; the Knights have it smaller and from a narrow ribbon at the button-hole.

Duchy of Saxe-Coburg-Gotha. The Order of the Saxe-Ernestine House (*fig. 23*), founded 1833 for Saxe-Coburg-Gotha, Saxe-Altenburg, and Saxe-Meiningen-Hildburghausen by Dukes Frederick, Ernest, and Bernhard Erich Freund, as a renewal of the Order of German Honesty, established by Ernest the Pious in 1690, consists of Grand Crosses, twelve Commendators of the first and eighteen of the second class, and thirty-six Knights. The badge of the Order is a gold, white enamelled Maltese cross, between the arms of which are golden lions, two marked with black and two with white. On the face is a round gold shield, with the bust of Ernest the Pious in gold, and, in a blue enamelled margin, the inscription, *Fideliter et constanter*, about which is wound a green gold-bound oak wreath. The central shield of the reverse displays the arms of the House of Saxe, border and wreath as before, but as inscription, 25 December, 1833. Above the cross is a gold crown. For foreigners, the oak wreath is left out; for the military, it becomes a laurel wreath, and the cross rests upon two crossed swords. For the duchy which belonged to the founder, the upper arm of the cross bears his name. The order is of three sizes. Grand Crosses wear it from a hand-broad; red, green-bordered ribbon, *en echarpe*, from the right, and with it an embroidered eight pointed star, the points alternately of gold and silver, on which lies the white Maltese cross, with a gold central shield bearing the green rue-crown. In the blue border, about which is wound a green oak wreath (wanting for foreigners), stands the device, *Fideliter et constanter*. The Commendators wear the order *en sautoir*, and the first class have also, on the left breast, the cross from the order-star of the Grand Crosses. The Knights wear the order from a narrow ribbon at the breast.

Duchy of Saxe-Altenburg. The Cross of Distinction for Service for Officers (*pl. 31, fig. 24*) founded by Duke Joseph Frederick Ernest in 1836 for those officers who had served the state honorably for twenty-five years, is a silver cross, with gold border and a gold central shield, having on one side the cypher J. F. E. under a crown, on the other, XXV., and is worn from a green, silver-bordered ribbon, one and a half inches wide, on the breast.

The War Medal for 1814 (*fig. 25*) was instituted by Duke Ernest in 1816. The medal is of silver, and has for inscription, *Dem Vertheidiger des Vaterlandes* (To the defenders of the fatherland), 1814; and the circumscription, *Ernst H. z. S. C. S.* The reverse displays a Maltese cross in an oak wreath. The ribbon is green and white striped.

Duchy of Saxe-Meiningen. The War Medal for 1814 (*fig. 26*), established by Duchess Louise Eleonora in 1816, is of silver, and displays on one side a Maltese cross, surrounded by an oak wreath, on the other the

inscription, *Dem Vertheidiger des Vaterlandes*. 1814; and the circumscription, *Louise Eleonore v. H. z. S. O. V. u. L. R., Obervormünderin* (Chief Guardian) and *Landesregentin* (Regent). The ribbon is striped green and white.

Duchy of Saxe-Hildburghausen. The War Medal for 1814–15 (*pl.* 31, *fig.* 27), established in 1816 by Duke Frederick of Saxe-Altenburg for the then Hildburghausen troops, is in all respects like the last described, only having the superscription, *Friedrich H. z. S. H.*

Duchy of Saxe-Gotha-Altenburg. War Medal for 1814–15 (*fig.* 28), established in 1816 by Duke Emilius Leopold Aug. of Saxe-Gotha-Altenburg: for the privates of gun-metal, for officers gilded, having on one side the Altenburg rose, on the other a prince's crown, with the circumscription, *Im Kampfe für das Recht* (In Battle for the Right). On the edge stands, *Herzogthum Gotha und Altenburg*. MDCCCXIV. MDCCCXV. The ribbon is green, with yellow and black border.

Duchy of Brunswick. The Order of Henry the Lion (*fig.* 31), founded in 1834 by Duke William, in memory of his grandfather Charles William Ferdinand, consists of four classes: Grand Crosses, Commanders of the first and second class, and Knights. The badge of the Order is a golden, blue enamelled Maltese cross, adorned with gold balls at the points, and with a red central shield. Upon the face of the cross is the helmet of the Brunswick escutcheon, with its crest, so arranged that the helmet lies upon the lower arm; the crowned pillar, with the galloping horse and the two sickles, on the central shield; the peacocks' tails on the three remaining arms. In the angle of the upper arm, between two laurel branches, is the golden Lion of Brunswick, under a ducal crown. In the angles of the cross, between the arms, is the name-cypher, *W.*, surmounted by a crown. On the reverse of the cross, in the red central shield, stands the motto, *Immota fides*, in gold; and in the golden border, the date, MDCCCXXXIV. The order is of three sizes. Grand Crosses wear it *en écharpe*, from left to right, from a broad, red, yellow bordered ribbon, and with it a star with silver rays, on which lies the golden, blue enamelled cross of the Order, having a silver central shield, with the golden name-cypher, *W.*, with a crown, and bearing the motto, *Immota fides*, in its red edge. They have also a golden collar, in which, between two chains, the Brunswick escutcheon (Brunswick and Lüneburg), surrounded with standards, alternates between two lions and a round field. This field is of silver, with the golden name-cypher *W.*, with the crown, and has a red border, with the inscription, *Immota fides*. Commanders wear the Order *en sautoir*, and the first class have besides, the Maltese cross of the order embroidered in silver on the left breast, with the crowned name-cypher in the angles, in gold, and a red central shield, bearing the motto, *Immota fides*, and on its golden verge, the date, MDCCCXXXIV. Knights wear the small cross at the breast, from a ribbon one and a half inches wide.

The Waterloo Medal (*pl.* 31, *fig.* 29^a) was established in 1818 for the troops who had fought through the campaign against France, by the Protectoral (English) Government. This medal displays on one side the bust

of Duke Frederick William, with the circumscription, *Friedrich Wilhelm, Herzog* (Duke), and on the other the date, 1815, in a laurel wreath, with the circumscription, *Braunschweig seinen Kriegern: Quatrebras und Waterloo* (Brunswick to her brave Warriors). The medal is worn from a bright yellow ribbon with sky-blue border. The name and rank of the bearer stand on the edge.

The Service-Distinction Cross for Officers (*fig. 29^b*). This decoration for from ten to twenty-five years' service, was established by Duke William, April 7, 1830. Officers who have served twenty-five years and upwards received a golden, deep red and black enamelled cross, whose white enamelled central shield bears on the face a W, with a crown, and on the reverse the number 25, and which is worn at the breast from a royal blue, yellow bordered ribbon. Non-commissioned officers and soldiers receive at the same ribbon, for twenty-five years' service, a silver cross, with name-cypher and number as the preceding, and rays in the angles; for twenty years' service, a silver cross without rays, with cypher and the number 20; for fifteen years' service, a silver buckle, with the number 15; for ten years' service, an iron, silver bordered buckle, with the number 10.

Duchy of Nassau. The Military Service Decoration (*fig. 30*) was established in 1834 by Duke William, and consists, for officers who have served twenty-five years honorably, of a golden cross, which has on the face the name-cypher of the Duke in the central field, and on the arms of the cross the words, *XXV treue Dienstjahre*; on the central field of the reverse the inscription, *25. Februar, 1834*; and is worn at the breast from a sky-blue ribbon. Non-commissioned officers and privates receive the same cross in silver, but of three classes, for twenty-two, sixteen, and ten years' service, with corresponding numbers. The first class has the ribbon like the officers, but for the second it has a border of one, and for the third, of two golden yellow stripes.

Grand Duchy of Mecklenburg. The Military Service Cross (*fig. 32*) was established in 1831 by the Grand Duke Paul Frederick of Mecklenburg, for such of the military as had served faithfully twenty-five, twenty, fifteen, and ten years. It consists of a simple cross, which for the first class is of silver, with a gold shield; for the second, of silver; for the third, of bronze, with silver shield; and for the fourth, entirely of bronze. The shield has on one side the name-cypher P. F. M., under a crown; on the other, the number of years' service. Officers and officials in that rank bear a gold cross, but all classes wear it at the breast from a crimson silk ribbon with blue and gold border.

Grand Duchy of Oldenburg. The Military Honor Cross (*fig. 33*) for twenty-five years' service, was established by the Grand Duke Augustus on the 24th December, 1838. For officers, it is of gold, for non-commissioned officers and privates of silver, having in its central field on one side the number XXV., on the other the letters P. F. A., under a crown, and is worn from a crimson ribbon with sky-blue border. The cross bestows increased pay and pension.

Grand Duchy of Anhalt-Köthen. The War Medal for 1813-15 (*fig. 34*)

was established in 1819 for those who had fought through the above mentioned campaigns in the army of Köthen without reproach. It is of iron, and has on one side, over two oak branches, the inscription, *Den Vaterlandsvertheidigern*, 1813, 1814, 1815 ; and on the other the name-cypher of Duke Louis, over two laurel branches and under a crown. The numbers change according to the campaigns made. The medal is worn from a half white half leaf green ribbon.

Duchy of Anhalt-Dessau. The Cross for Volunteers of 1813–15 (*fig. 35*). As early as 1815, the volunteers of Anhalt-Dessau were permitted to wear, as a distinction, a green ribbon with deep red and white border ; in the year 1823 a bronze cross was added to this, having on one side the inscription, *Anhalt's tapfern Krieger* (to the brave warriors of Anhalt), 1813, 1815 ; and on the other a ducal crown, with the letters L. F. *Franz*, H. v. A. The four quarters of a green laurel wreath lie between the arms of the cross.

France. Order of the Legion of Honor (*pl. 32, fig. 1*). The first institution of this falls in the year 1802 (2d May), and the order has maintained itself through all storms and revolutions to the present time, but the decoration has undergone occasional changes. The number of Grand Crosses amounts to 80, Grand Officers 140, Commanders 400, Officers 2000 ; the number of Knights is unlimited. The bestowal of the order is restricted by very exact conditions. The badge of the Order is a white enamelled, gold, five armed Maltese cross, with gold balls at the points. In the golden central field is the bust of Henry IV. within a blue border, the inscription, *Henri IV.*, and two laurel twigs. The central shield of the reverse displays a stand of French colors, and in the blue margin the circumscription, *Honneur et patrie*. The cross lies on a green enamelled wreath, half of laurel, half of oak leaves, and over it is a crown. The order is of two sizes ; the smaller is for the officers : the Knights have a star, on the central field of which all is of silver which for the officers is of gold. The Grand Crosses wear the order *en echarpe* from right to left, from a broad red ribbon, and with it, on the left breast, a silver embroidered star, which is formed like the order, but has a silver central shield with the gold bust, and a gold margin with the inscription, *Honneur et patrie*. Instead of wreaths there are stands of tricolored flags in the angles. The Grand Officers wear the order *en sautoir*, and the star ; Commanders, only the order *en sautoir* ; Officers and Knights, the order at the breast.

The Cross of July (*pl. 32, fig. 2*) was instituted on the 30th December, 1830, by Louis Philippe, in remembrance of the days of July. It is a three-armed silver Maltese cross ; the round central shield has three bands of blue, white, and red in succession, with, on one side, in the red band, the words, *Patrie et liberté*, in the blue, a gold field, with the Gallic cock, and on the other side, in the red band, the words, *Donné par le Roi des Français* ; in the blue, 27, 28, 29 *Juillet* ; and in the white, 1830. The cross is surrounded by an oak wreath (green enamelled), and hangs by this from a mural crown. The riband from which the cross is worn at the breast is royal blue, with red border.

Kingdom of Great Britain. The Order of St. Michael and St. George

(*fig. 3*) was founded in 1818, by George III., for the Ionian Islands; altered by George IV. in 1826; and again changed and enlarged by William IV. in 1832. It consists of three classes: fifteen Grand Crosses, twenty Commanders, twenty-eight Cavaliers, natives of Great Britain or Ireland, Companions. Yet this number is not rigidly adhered to. The order confers personal nobility. The badge of the Order consists of a seven armed, golden, white enamelled Maltese cross, under a king's crown of gold; for clerical members, under a bishop's mitre. The golden central shield displays on the face the Chevalier St. George on horseback with the Dragon; on the other side, the Archangel St. Michael with the Dragon. Both sides are surrounded with a blue enamelled border, which bears the device of the order: *Auspicium melioris ævi*. Grand Crosses wear the order *en echarpe*, from a ribbon of blue and crimson in three equal stripes, and with it a seven pointed, silver embroidered star, like the order, on the breast. Between each two points is a bundle of golden rays. In this star the seventh point is under. On it lies a simple red, gold bordered cross, on the central field of which the Archangel Michael appears, and which is surrounded by a blue border, containing the device of the Order: *Auspicium melioris ævi*. The golden collar has in the middle two lions of St. Mark, with bundles of seven arrows, and over them the English royal crown; then follows on the left the cypher, S. M., and on the right, S. G.; then on each side a white enamelled, gold Maltese cross, and next the English lion. Above and below, gold chains unite the different pieces. Commanders wear the order *en sautoir*, and a recumbent Maltese cross in silver, with silver rays between the arms, on the breast. On this star is a cross as on the star of the Grand Crosses. Chevaliers wear the order from a narrow riband at the breast.

The Military Decoration (*pl. 32, fig. 4*) has various badges: for higher officers, medals; then medals with slides, crosses, and crosses with slides. The simple medal is for the first battle, for the next the slide is added. After four battles comes a golden cross (*fig. 4*), which has in the centre the English lion over a laurel branch, and in the four corners the names of the battles. To this is added again slides with the names of new battles, and England has officers with the cross and seven slides. Medals and crosses are worn from a deep red riband with sky-blue border.

Russian Empire. The Royal Imperial Order of the White Eagle (*fig. 5*), it is said, was founded in 1325 by King Wladislaus V. of Poland. King Augustus renewed it in 1705. At the partition of Poland in 1795, it seemed to expire; but when King Frederick Augustus became in 1807 Duke of Warsaw, he again renewed it, and subsequently the Emperor Nicholas made it a Russian Order. The badge consists of a golden, red enamelled Maltese cross, with gold balls at the points, on which is displayed a white enamelled eagle with outspread wings. This cross lies upon a golden, black enamelled hexagon, within which is a golden triangle, whose points touch the hexagon. The whole of this lies upon the Russian double-headed black eagle, of gold, black enamelled, and this hangs by two chains from the Russian imperial crown. There is only one class, and the order is

worn *en echarpe* from a broad sky-blue riband. With this is worn upon the breast a golden eight pointed star, with a gold central shield, upon which lies a gold cross with wide red border. The central shield has a blue border, with the inscription, *Pro fide, rege et lege*. The members of the Order are named by letters in the Emperor's own hand.

The Royal Imperial Military Service Decoration was founded by King Stanislaus Augustus of Poland, but afterwards, when the king acceded to the congregation of Targowitz, suppressed, and first renewed on the 26th December, 1807, by King Frederick Augustus of Saxony, Duke of Warsaw, with all the rest of the Polish orders. The Emperor Alexander made it the third Polish order. After the Polish Revolution it became a Russian order, and was divided into five classes, but must no longer be conferred. The badge of the order for Grand Crosses and Commanders is a gold, black enamelled cross, with balls at the points, and the silver inscription, *Virtuti militari*. The gold central field displays, in a green laurel wreath, the White Eagle of Poland. Above the cross is the royal crown. Grand Crosses wear the order, *en echarpe*, from a blue riband with black border, and with it on the breast, an eight pointed silver star, bearing the cross of the Order. Commanders of the first class wear the order *en sautoir*, and with the star, of the second class without. Knights of the first class have a small gold cross (*pl. 32, fig. 6*), on whose four arms stand the letters S. A. R. P. (*Stan. Aug. Rex. Pol.*), and in the central field the words, *Rex et patria*. The cross is worn at the breast from a narrow blue riband with black borders. For Knights of the second class the cross is of silver.

The Ottoman Empire. The Order of the Crescent, founded in 1799 by Sultan Selim III. in honor of the victory at Aboukir, and first conferred on Nelson, consists of three classes, and is only given to foreigners for services rendered to the Porte. The badge of the Order is a round gold medal, upon whose red enamelled central shield is seen the Turkish crescent-moon and a star in diamonds surrounded by rays. The reverse displays, on a like red central shield, the name-cypher of Selim III. in gold. The order is worn by Knights of the first class from a broad, red silk riband, *en echarpe*, from the right, and with it, on the left breast, an eight-pointed star embroidered in silver (*fig. 7*), upon which lies the badge of the order, but in oval. Knights of the second class wear the order *en sautoir*; of the third class at the breast, from a narrow riband, and the moon and star are of silver only.

The Medal of Honor (*pl. 32, fig. 8*), which Selim III. likewise distributed after the battle of Aboukir, is like the Order of the Crescent, but entirely of gold, and worn from a ribbon of golden yellow.

Kingdom of Persia. The Order of the Sun-Lion (*fig. 9*) was founded by Feth Ali Schah in 1808, after the example of the Turkish Order of the Crescent, is conferred likewise on foreigners, and has two classes, Stars and Medals. The badge is a golden, white enamelled, six-pointed, rounded star with golden balls, which rests upon a green enamelled wreath of palm leaves. The central field displays the rising sun, and on the reverse, a couchant lion. It is worn from a flame-colored riband about the neck. The

medal is of gold, and displays only the central field of the star; it is worn at the breast.

Kingdom of Spain. The Military Order of St. Ferdinand (*fig. 10*) was established in 1811 by the Cortes-General, and renewed in 1815 by Ferdinand VII., in somewhat altered form, as Order of Military Merit. It has five classes, which can contain only officers of designated grades. The insignia are a gold, white enamelled, Maltese cross with gold balls. The golden central field displays the figure of St. Ferdinand enamelled in colors, and the blue border contains the words, *Al Merito Militar*. For the higher classes the cross has a laurel wreath in its angles, and for the two highest a laurel wreath above also. It is worn from a deep red riband with gold-yellow border. The Star of Grand Crosses is likewise a Maltese cross, like the order, but embroidered in gold and having gold lilies in the angles. The central field is that of the order, only rather larger. First class, star and order with two wreaths, *en echarpe*. Second class, order with two wreaths, *en sautoir*. Third class, order with two wreaths, at the breast. Fourth class, order with one wreath, at the breast. Fifth class, order without wreath, at the breast.

Crosses of Honor for military distinction are very numerous. *Fig. 11* shows that for the battle of Talavera de la Reyna, which was established by the Spanish Council of Regency in 1810. It is a gold, white enamelled, Maltese cross, with golden balls under a royal crown, and bears the inscription, *Talavera, 28 de Julio de 1809*. It is worn from a half black, half deep-red riband.

Kingdom of Portugal. The Order of Avis (*pl. 32, fig. 12*), called formerly of Evora, was founded by the first King of Portugal and changed in 1162 into an Order of Spiritual Knighthood, but by Queen Maria in 1780 made a secular Order of Military Merit, and has 6 Grand Crosses, 49 Commanders, and an unlimited number of Knights. The badge is a gold, bright green enamelled, lily-cross, above which is an eight-pointed gold star, with golden rays in the angles. On the star is a gold central shield, upon which lies a red, blazing heart, surrounded with a crown of thorns; in the flames of the heart is a gold, black enamelled cross. The order is worn by the Grand Crosses from a leaf-green riband *en echarpe*, and with it, on the breast, embroidered in silver, a sun with a white, gold-bordered central shield, on which lies the green lily-cross, but over the shield the flaming heart with the cross. Commanders wear the order *en sautoir*, Knights smaller, at the breast.

Kingdom of the Two Sicilies. The Order of Francis I. (*fig. 13*) was founded by Francis I., the 23d Sept. 1829. The Order has three classes, Grand Crosses, Commanders, and Knights. The badge of the Order is a gold, white enamelled, Maltese cross under a crown royal; in the angles of this are four Bourbon lilies in gold; the golden central shield contains, on the face, in a green laurel wreath, the letters F. I. under a crown; on the reverse, the words, *Franc. I. instituit, 1829*. The blue border of the central shield contains the words, *De rege optime merito*. The order is worn from a deep-red riband with blue border. The Star of Grand Crosses

is in all respects like the order, without the crown, and is embroidered in silver.

Kingdom of Sardinia. The Royal Military Order of Savoy (*fig. 14*), founded by King Victor Emanuel in 1815 for military only, has four classes, Grand Crosses, Commandators, Knights, and holders of the silver cross (non-commissioned officers and soldiers). The badge of the Order for the three first classes is a golden, white-enamelled, St. Lazarus cross, in the angles of which appear the arms of a golden, green enamelled, Maltese cross with balls at the points, under a golden king's-crown. Grand Crosses wear this from a broad, green riband, *en echarpe*, and with it a silver-embroidered, eight-pointed star, adorned with the cross of the Order without the crown. Commanders wear the order *en sautoir*: Knights at the breast. The badge of the Order for the fourth class is wholly of silver, with gold edges, and a rosette instead of the crown. The Military Medal established by Charles Albert in 1833, is given in gold and silver. The face displays, between two laurel branches, a round shield with a cross and a king's crown over it. The circumscription reads, *Al valore militare*. The reverse (*pl. 32, fig. 15*) contains between two laurel branches the name of the possessor. The medal is worn from a blue silk riband.

Papal States. The Order of St. Gregory, founded in 1831 by Pope Gregory XVI., has Grand Crosses of the first and second class, Commanders, and Knights. The badge of the Order is a golden, red enamelled Maltese cross with golden balls. The blue central shield displays the golden bust of St. Gregory, and in the golden border the inscription, *S. Gregorius magnus*. Over the cross the military have a golden trophy, civilians a green oak-branch. Grand Crosses of the first class wear the order from a red, yellow bordered riband, *en echarpe*, from the right, and on the breast an eight-pointed star, silver embroidered, with the badge of the Order (*fig. 16*). Grand Crosses of the second class wear the order *en sautoir* with the star; Commanders, the order only, *en sautoir*; and Knights, the order, at the breast, and smaller.

Grand Duchy of Tuscany. The Silver Military Medal (*fig. 17*) was established in 1815 for non-commissioned officers and soldiers. The face contains the bust of the Grand Duke Ferdinand III. with a circumscription; the reverse, in a laurel wreath, the words, *Ai prodi e fedeli Toscani, 1815*. It is worn from a riband half red, half white.

Kingdom of Greece. The Order of the Redeemer, founded by King Otho in 1833, has five classes: 12 Grand Crosses, 20 Grand Commanders, 30 Commanders, 120 Knights of the gold, and an unlimited number of the silver cross. The badge of the Order consists of a white enamelled Maltese cross, covered with the royal crown. The centre of the cross, surrounded with a green wreath of oak and laurel, displays, in a blue field, the Greek cross with the Bavarian centre shield, and in the blue border the words, *Ἡ ΔΕΞΙΑ ΣΟΥ ΧΕΙΡ ΚΥΡΙΕ ΔΕΔΟΞΑΣΤΑΙ ΕΝ ΙΣΧΥΙ* (Lord, thy right hand is glorious in power). The reverse displays the bust of the founder, with the circumscription (in Greek), *Otho, King of Greece*. The silver cross is precisely like the gold in shape, but has everywhere silver

instead of gold. Grand Crosses wear the order from a broad, blue, white bordered riband, *en echarpe*, from the left, and on the left breast a star (*pl. 32, fig. 18*), which is embroidered with eight long and forty short rays, and upon which rests the badge of the Order, so changed that the motto is not upon the cross but on a broad blue border around the same. Commanders of the first class wear the order *en sautoir*, and a somewhat smaller cross on the right breast. Commanders, the cross alone, somewhat larger than the Knight's cross, *en sautoir*; Knights, the cross, on the left breast.

Kingdom of Belgium. The Order of Leopold (*fig. 19*) was founded on the 11th July, 1832, by King Leopold, and has four classes: Grand Crosses, Commanders, Officers, and Knights. The decoration is a golden, white enamelled Maltese cross, with balls at the points, which are united by an oak and laurel wreath. In the centre is a black enamelled shield with a red, gold-edged border, which contains on the face the name-cypher of the king, consisting of two L's and two R's, on the reverse the Belgian lion. The face of the border contains, the device *L'union fait la force*; the reverse two laurel branches. Over the cross is a royal crown, and for companions who belong to the military two crossed swords below this. The riband is of deep red silk and of three widths, as the decoration is of three sizes. The golden collar for Grand Crosses consists alternately of a crown with the Belgian lion on each side, and the double name-cypher of the king between two chains. Grand Crosses wear the decoration *en echarpe* from the right, and on the left breast a silver eight-pointed star, with the central shield of the decoration (with the lion), which for military rests upon two crossed swords. Commanders wear the decoration *en sautoir*, and at the same time in silver and colors (for military resting on two crossed swords), embroidered on the left breast. Officers and knights wear the cross from a narrow riband at the breast.

Kingdom of Sweden. The Seraphim Order (*fig. 20*) is said to have been founded by King Magnus I. in 1280, and was renewed by King Frederick I. in 1748, and increased under Charles XIII. The Order has only one class, and the candidate for it must have received already the Orders of the Sword, and of the North Star. The decoration is a golden, white enamelled Maltese cross, with balls, under a royal crown. The lozenge-shaped, blue central shield, contains on the face the letters I. H. S. (*Jesus Hominum Salvator*), over the centre of which stands a cross, and on the reverse the words, *Fredericus rex Sueciæ*. The central field is surrounded by four golden seraphim heads and four golden patriarchs' crosses. The decoration is worn from a broad blue riband *en echarpe* from the right. With it, on the left breast, a silver Maltese cross, with a round, blue, central shield, which contains the above-mentioned letters, &c., in white, with gold edges, and also three gold crowns, two above, one below, and under these three gold nails. On the arms of the cross lie the four silver patriarchs' crosses, and between the arms the four silver seraphim heads. The golden collar, for festal occasions, consists of gold seraphim heads, and blue, gold-edged patriarch crosses alternately between the chains. Grand officers

wear the order *en sautoir* and the star. Lower officers the cross on the breast. There is a peculiar Order costume for ceremony.

The Medal for Bravery in the Field (*pl. 32, fig. 21*) is of gold for officers, for the rank and file of silver, is worn on the breast from a yellow, blue bordered riband, and contains on the face, between the laurel branches, the words, *För Tapperhet i Fält* (For bravery in the field); and on the reverse, also between two laurel branches, the name of the holder and the date of bestowal.

Kingdom of the Netherlands. The Military Order of William (*fig. 22*) was founded by King William in 1815, and has four classes; Grand Crosses, Commanders, Knights of the third and fourth classes. The decoration is a golden, white enamelled Maltese cross, under a king's crown, in the angles of which lie four green enamelled laurel twigs; for grand crosses this Maltese cross displays a blue central shield, in which, between two golden laurel twigs, stands the letter W. For other classes, instead of the central shield, there is a gold, or white enamelled gold bordered fire steel; knights of the fourth class, however, for whom the cross and crown are of silver, have the blue central shield with the name-cypher upon the cross. On the arms of the cross stands the device, *Voor Moed Beleid Trouw* (For Courage, Conduct, Truth). Grand Crosses wear the decoration *en echarpe* from a broad, orange silk riband, with two narrow blue stripes at the sides, and with it on the breast an eight-pointed silver star, upon which is the decoration of the Order (with the gold fire steel). Commanders wear the decoration *en sautoir* and embroidered on the left breast, after *fig. 22*; knights of the third and fourth classes from a narrow riband at the button hole.

The Medal for Faithful Service (*fig. 23*) was established by King William in 1825, for 12 and 24 years' service, and is worn in bronze and silver from an orange colored riband. It displays on one side the Netherlandish arms with the inscription, *Voor trouwen Dienst*, on the other the name-cypher W. on a royal mantle, under a crown.

Kingdom of Denmark. The Order of the Elephant (*pl. 32, fig. 24*), one of the most distinguished of European orders, is said to have been founded by King Canute VI. It was renewed by King Christian I. in 1458. According to the latest statutes of Christian V. of 1693, there are, besides the princes, only 30 knights. The decoration is a white enamelled elephant, with gold tusks, and blue, gold seamed housing and girths. Upon the housing lies a cross of five large table-diamonds; the elephant carries a red enamelled tower, set forth with brilliants. The decoration is worn *en echarpe* from the left, from a broad sky blue riband. With it belongs a silver star with four long rays, four of half the length and thirty-two short, with a round, gold, central field, upon which two laurel branches form a silver wreath, inclosing a red field with a cross of ten brilliants. The golden collar, for festal occasions, consists of golden elephants with blue housings, having the letter D, alternating with gold towers, between two gold chains.

The Danebrog Order (*pl. 31, figs. 20, 21*) is said to have originated as early as 1279; in 1690 it was renewed; and made by Frederick VI., in 1808, an Order of Merit. The Order has four classes: Grand Command-

ers, Grand Crosses, Commanders of the Order, and Knights. Besides these, there has been since 1809 a fifth class, the Danebrogsmen, who wear the decoration of silver entirely. This cross is given even to the knights and higher classes of the Danebrog Order as a new favor, and worn in addition to the decoration of the Order. The decoration is an oblong, golden white enamelled cross, with wide red border. In the angles of the cross, placed over the corner, are four golden royal crowns, and above the cross the golden name-cypher, F. R. VI., surmounted by the royal crown. The face bears, on the arms of the cross, the inscription, *Gud og Kongen* (God and the King), and in the centre a W under a crown; the reverse has likewise a W under a crown in the centre, and the dates 1279 on the left, 1671 on the right, and 1808 above. This is the knight's cross, and is worn at the left breast, from a white riband $1\frac{1}{2}$ inches wide, with red borders. The Commanders of the order wear the same a little larger *en sautoir*. Grand Crosses have a cross like that of the knights, but without the name-cypher and crown, and the white enamelled part is replaced by fourteen brilliants. This cross is worn *en echarpe* from a broad white riband with red borders, and with it on the left breast the decoration of the Order embroidered, a white, gold bordered cross, with the full inscription in gold, about this a red border, and round that again gold pearls. Grand Commanders wear the insignia of the Order entirely in brilliants (*fig. 21*), the cross red, edged with gold, bordered, *en sautoir*, and on the left breast a silver embroidered star (*fig. 20*) bearing the decoration of the Order for Grand Crosses.

Empire of Brazil. The Order of the Southern Cross (*pl. 32, fig. 25*), founded by the Emperor Don Pedro I. in 1822, and for ladies also, has four classes: Grand Crosses, Dignitaries, Officers, and Knights. The decoration of the Order is a golden, white enamelled, five armed cross, set with balls at the points, upon a golden, green enamelled laurel wreath, the middle point under, surmounted by the imperial crown. The golden central field displays the bust of Don Pedro I., and has a blue border, with the inscription, *Petrus I. Brasilæ imperator*. The reverse of the central shield displays four golden stars, and in the blue border the device, *Præmium bene merentium*. The cross is of three sizes, and is worn by Grand Crosses from a broad blue riband *en echarpe* from the right; by Dignitaries large; by Officers smaller *en sautoir*; and by Knights the smallest size, with a buckle at the breast. Grand Crosses, Dignitaries, and Officers have besides a gold five-rayed star embroidered on the left breast, the middle point under and over the star an imperial crown. Upon the blue, circular, central shield are four golden stars, and in the blue border stands the device, *Præmium bene merentium*.

D. MILITARY ENGINES IN GENERAL. PROJECTILES.

ANTIQUITY.

Before gunpowder was invented, and the enormous force with which it projects a missile was known, no other power was available, of course, for war machines, than that produced by the immediate application of human strength, increased in some cases by the intervention of mechanical aids. These mechanical aids were chiefly the power of the lever and of the spring. In the war engines of antiquity we have to do with these alone.

The implements of which the ancients made use in war and in sieges may be most simply divided into: *a*, darting and slinging engines; *b*, battering engines; *c*, machines for transport; and *d*, implements for defence.

a. PROJECTILE ENGINES. To these belong *catapults* and *ballistæ*, which with the ancients took the place of artillery. They are divided into those where the power of the spring and those where the power of the lever was used. The first, the catapults, took the place of our cannon; they served to project arrows or balls in a direct line or with slight elevation; the latter, with which stones and fragments of rock were projected in lofty curves, took the place of our mortars, and were called ballistæ. The later Roman authors have constantly confounded these two names, have even applied them both as synonymous with catapult, and given to the ballista the name of *onager*. By the Greeks, however, the distinction has always been strictly maintained. The smallest catapults were the *scorpions*. There were field and siege engines, according to their use, the latter being much the largest.

The bows of the light-armed troops led to the construction of the catapult, which was indeed nothing else than a bow on a very large scale. The lightest kind of catapult was the hand catapult, the scorpion (*pl. 33, fig. 3*), a bow upon a light stand, which could be aimed high or low, and which was drawn at first with the hand, afterwards with a winch, as the string tightened, until it came to the trigger. The field catapult, somewhat larger, was laid upon a trestle (*fig. 1*). The bow was longer and heavier, and the string was stretched by the application of a double lever, which had the form of a λ . The long arm of this lever rested against a fixed point, and the shorter pressed the string back to the trigger, when the long arm was depressed. Another species of field catapult, which, however, drove its arrow only a short distance (*fig. 2*), has no bow, but the arrow is projected by the strong blow of a striking lever, which lies obliquely at the hinder end of the catapult. Siege catapults were designed either to discharge many arrows at once during an assault (*fig. 4*), or to drive great javelins and beams to a considerable distance. The first consisted of an upright plank, with cross cuts, in which feathered arrows were laid, their points resting upon movable supports at a greater or less elevation, as desired. An elastic board, fastened below, and drawn back by means of a rope at the top, struck, when let loose, against the arrows, and drove them forth.

The heavy catapult (*fig. 5*) projected arrows of six feet in length and sixty pounds' weight to the distance of about four hundred paces. This catapult had no proper bow, but two pieces of plank, *a, a*, which were inserted between strong ropes, *c, c*, in the main frame, and those ropes so twisted by means of the racket wheels, *d, d*, that the ends of these planks pressed powerfully against the cushions, *m, m*. If now, by means of the windlass, *y*, and the hook fastened to it, the bow string, which was made of twisted hide, was drawn strongly backwards, the ropes at *c c* were thereby still more sharply twisted together, and when the string was suddenly let loose, it drove the arrow, lying in its groove, *r, r*, with great violence before it. Afterwards the two pieces, *a, a*, were replaced by a strong steel bow. Of the ballistæ there were also lighter kinds for field use, and heavier for siege service. The field ballista (*pl. 33, fig. 6*) was placed upon a light car, and consisted of a strong frame, having between its uprights a twisted rope, as seen in our common wood saw; and in the twist of this rope, as the key, a ladle at the end of a strong handle. This ladle is drawn back by means of a rope, a stone laid in it, and the draw then suddenly let go, when the ladle strikes with violence against the cap of the frame, and the stone is projected with great force by the impulse it has received, with so much the greater, indeed, as the rope is more strongly twisted. Another kind of field ballista is the sling ballista (*fig. 7*) and (*pl. 34, figs. 3, 4*). Beside a groove made of planks stands a post, upon which is a cross-beam with pins at the ends; on these pins a fork moves, at the ends of which are fastened boxes loaded with weights or stones. The bow of the fork bears a long handle, reaching downwards to the groove, at the extremity of which is attached an ordinary stone sling. When, by means of a rope and small winch on the ground, the long arm of the lever is drawn down (*fig. 3* and *pl. 33, fig. 7*) and the sling is loaded, the draw rope is let loose, and the counter weights, which have attained their highest elevation, pull the handle suddenly upwards, and thus the sling is discharged (*pl. 34, fig. 4*). The heavy ballistæ are like the light, only much larger. *Pl. 33, figs. 8 and 9*, represent such siege ballistæ. *A, A, A*, is the ground frame upon which the uprights, *B, B*, are erected, on whose cap, at *E*, is a projection, against which the handle, *C*, of the ladle, *S*, strikes when it flies up, to give the back stroke. The handle, *C*, is twisted into a rope, which is tightened on each side by means of the racket wheels, *Q*, which are turned by the racks, *X*, and held in place by the stops, *Y*. In order to set the ballista, a rope is attached just below the ladle, *S*, and wound round the roller, *T*, which is turned by handspikes, and held in place by a racket wheel. As soon as the ladle is charged, the rope is let loose and the ladle flies up (*fig. 9*). With such ballistæ, stones of from ten to three hundred and sixty pounds' weight were hurled. Archimedes, indeed, constructed ballistæ which threw stones of ten hundredweight; quantities of heavy leaden balls were also discharged from the ballistæ. A smaller ballista for fire balls is shown, *pl. 34, fig. 5*. Fire arrows were shot by the catapult.

b. BATTERING ENGINES. The most ancient and simplest wall breachers are the wall borers, by means of which the joints of a fortress wall were

penetrated, and then the stones broken out. The first borers consisted (*pl. 33, fig. 11*) of a spindle with a sharp iron head, which was laid upon trestles and turned by means of a winch. Later, the borer was placed in a rolling frame (*fig. 10*), and forced forwards by a screw against the wall. These wall augers being too slow and tedious, however, and their effects too imperfect, it was soon found better to crush, shatter, and knock out the stones, than laboriously to extricate them in this manner. For this purpose the *ram* was invented. The rams were long, heavy beams, frequently from fifty to one hundred feet in length, which, at the foremost end, were strongly plated with iron, this plating being usually in the form of a ram's head. From this and the butting motion of the machine it received its name. Yet there were rams also which were mounted with one or more points. These beams were suspended in equilibrium from the top of a lofty frame by ropes (*fig. 12*), brought up close to the wall by means of rollers on the frame, and then, by one or several ropes attached to the hinder end, were set into a swinging motion, and thus made to strike against the wall, which by degrees was shattered and overthrown. This kind of machine was called the swinging ram, and the simplest form is shown in *pl. 35, fig. 8*. In another form of construction used when the beam was very long, it was laid upon a carriage with numerous rollers (*pl. 33, fig. 13*). This carriage ran upon a frame constructed for that purpose, and supported on a scaffold, in which frame it was pulled backwards and forwards, by means of ropes from each end passing over rollers at the ends of the frame, and thus the beam was made to strike against the wall. The battering-ram which Demetrius Poliorcetes used at the siege of Rhodes was 106 feet long; and Vespasian had, in the war against the Jews, a ram which, though only 50 feet long, was armed with a mighty iron butt of twenty-five points, each of which was as thick as a man, and two feet apart. The counter-weight at the hindmost end amounted to 1075 cwt., and 1500 men were required to work this machine. For transportation, the rams were loaded on small carriages (*fig. 14*), on which also they were sometimes used when the walls were weak.

c. MACHINES OF TRANSPORT. In order to bring troops upon the wall of a besieged city, or at least to bring them on a level with the breast-works and thus render an encounter with the garrison practicable before the walls were destroyed, machines of transport were employed, of a magnitude such as it is now scarcely possible for us to conceive. To these machines of transport belong, first, the draw basket (*pl. 35, fig. 10*), which served to convey a larger or smaller number of soldiers upon the hostile wall, and thus perhaps enable them to surprise some unguarded place. For this object a mast was planted in the ground, and at its summit a cross-beam suspended in equilibrium, after the manner of the draw-well. To the foremost end of this beam a large basket, or rather a platform with a railing, was attached, in which the warriors mounted, when, by drawing down the hinder end of the beam, the platform was elevated to the height required. To bring greater numbers of men upon a level with the battlements of the wall, and enable them to mount thereon, or to fight with the defenders at the same

elevation, movable towers were erected. Such movable towers were constructed of carpenters' work, with steps on the inside, and with a platform and battlements, set upon rollers or wheels, and by means of pulleys and windlasses moved on to the point of attack. Frequently these towers, when they were designed to effect the actual scaling of the wall by the troops, were provided with a drawbridge, which was let down as soon as the tower reached the designated spot, and thus a passage was established for the troops from the tower to the wall.

As to the construction of these movable towers, it did not differ greatly from that of a house with several stories, for they consisted of several rows of uprights, united by horizontal tie-beams, which formed the stories. The whole was made firm and strong, and so bound together within, that it could not only sustain its own weight and that of the soldiers, but endure being moved from place to place. We can scarcely conceive how it was possible to move these enormous machines upon so few wheels, for, according to the testimony of ancient authors, the largest towers had not more than eight and the smaller only four wheels. The height of the towers was regulated according to the wall which was to be attained; but there were such towers carried, in pieces, with the baggage of the army, and for which, in case their height was deficient, a mound was thrown up. The smallest towers were 120 feet in height, 34 feet wide, and usually of 10 stories: while the largest were 240 feet high, 47 feet wide, and had 20 stories. To this class belonged the tower of which Demetrius Poliorcetes made use at the siege of Rhodes (*pl. 35, fig. 4*), constructed by the Athenian architect Epimachus. This machine rested upon eight wheels on each side and could be moved from within, while a separate body of workmen assisted on the rear side without. The wheels had all of them trendles (*antistrepta*), so that the tower could be moved sideways and obliquely. At greater distances from the wall, the towers were moved by means of ropes and pulleys with windlasses, as our engraving shows. Every story had openings or windows, out of which beams or stones were shot, but these windows were filled with bags of skin stuffed with wool and only opened to shoot through them. Frequently the towers were provided also with exterior galleries, for bowmen and slingers, and on the ground-floor, or higher, battering-rams were placed to destroy the walls (*pl. 35, fig. 5*). Invariably these towers tapered off as they went up, and a drawbridge was always required to bring the troops who manned them upon the wall, as in *fig. 4*. Within the tower was usually a vat for water, in order to flood at once any part which might be set on fire by the fire-missiles of the foe. Sometimes the towers were not placed upon wheels, but moved by means of rollers, as that which Julius Cæsar employed at the siege of Namuronum (Namur). Usually the towers were hung, from top to bottom, with wet hides, as soon as they came within range of the enemy's missiles, or with covers of goats' hair, to preserve them from fire and to deaden the force of blows from the hostile shot.

Movable towers were used in later times also, and *fig. 6* represents such a tower of the twelfth century; it is surrounded on the summit by a

breast-work, the battlements of which formed embrasures for the projectiles then in use, some of which we shall again refer to hereafter. At the siege of Jerusalem by the Crusaders, the most important results were obtained by means of these towers. Godfrey of Bouillon, as William of Tyre relates, had three great movable towers built, whose front side, from the first story up, was double, so that when the tower reached the outer edge of the ditch, this front side formed a drawbridge long enough to reach across, was let down by ropes, fell on the hostile wall, and by its great width enabled a strong force to throw themselves upon the defenders of the rampart, supported by those stationed upon the platform of the tower (*pl. 34, fig. 24*). Only by means of these three towers Jerusalem fell, on the 15th July, 1099, after a siege of one month, into the hands of the Crusaders.

d. IMPLEMENTS OF DEFENCE. As soon as it became requisite to carry on works of long duration, entrenchments, &c., within the range of the enemy's missiles, means were sought to protect the laborers while thus employed. The simplest defensive implements here were *blinds*, walls about six or eight feet high and fifteen or twenty feet long. These screens were either straight or round. The straight ones (*pl. 33, fig. 17*) consisted of two frames of timber-work, between which bundles of twigs (fascines) or sand bags were placed; they were supported by trestles on rollers, and moved by men or by horses according to their size, backwards or forwards as the workmen receded or advanced. The round blinds (*fig. 18*) consisted also of frames, but with curved foot and cap pieces, and the field of the frame was set with thick planks or logs, in front of which, fenders of hide stuffed with wool or sand were hung, rendering the enemy's missiles ineffectual. These blinds were on rollers also, so that they might be moved when necessary.

To protect the workmen in wall-breaching, so that they should not be crushed by stones and beams hurled down upon them, the implements called *tortoises* were employed, structures which were covered at the sides and top. For the rolling ram these structures were simple sheds (*fig. 15*) standing on rollers, and moved by the persons inside up against the wall; then the frame for the ram was laid upon the floor of this shed. The tortoise for the swinging ram, however, was made much higher in front (*fig. 16*), as it had to protect also the lofty frame from which the ram was suspended. On the front side, and particularly on the roof, the tortoise was always hung with skins and hair covers, and these covers wetted as often as possible, to render ineffectual the enemy's efforts to set the machines on fire. The troops themselves, in the assault, formed also a species of tortoise, for protection against the stones and other missiles hurled from above (*pl. 35, fig. 11*) by holding their great shields over their heads, in such manner that the edges overlapped each other some six or eight inches or more, thus forming a kind of storm-roof, of such strength, indeed, that often a second column, and sometimes a third, was supported upon it, and thus the wall or a high-lying breach was mounted. Such tortoises were used also where the ram was applied in its simplest form (*fig. 8*), hung merely from a simple frame which leaned against the wall.

Other implements, employed by the besieged in defence, were those called the tongs and the crow.

The tongs or forceps (*fig. 9*) were double shears, which were let down from the wall by a rope, and which as soon as this struck the ram, opened and grasped it, when the head was pulled upwards and the ram thus rendered useless. The simple crow was a frame, like that for the draw-basket (*pl. 35, fig. 10*), but having at the point one or more hooks. It stood upon the terreplein behind the wall, and when the foe attacked it was swung downwards into the thick masses, catching in its hooks one or more persons, who were thus drawn upwards, and either made prisoners or dashed to the ground. The double crow was a stand with two arms, to which a long beam was attached horizontally, so that it could be let down upon the hostile ram, and thus by destroying its balance render it ineffectual.

THE MIDDLE AGES.

The earlier period of the Middle Ages, immediately following the times of Antiquity, shows us, in general, the same arms and implements then in use which we have already described, yet we find them constantly more and more improved by art, and, above all, rendered more movable. The projectile engines, in the main, were the same; yet the catapults had already undergone an important alteration; the wooden arms, represented in *pl. 33, fig. 5 aa*, having been exchanged for steel (*pl. 34, fig. 1*), which were fastened into the frame, and by their great spring power could work more effectually than the arms stretched by the twisted rope. These so-called *springels* were afterwards altered, by welding the two spring arms into a middle piece, and thus making a complete bow. The setting was effected by raising the upper part of the stock, which moved on a pivot, until the lever of the trigger caught over the string, when the trigger was pressed down, and then the stock depressed until it came into its place, when the arrow was laid on, and discharged by loosing the trigger-catch. These springels were subsequently made still smaller and more portable, and became the cross-bow, of which we have already spoken. A simple kind of springel is represented at *fig. 2*. To a post having notches on one side a brace is attached, resting in one or the other of the notches, and held by a pliable band, so that the arrow which lies upon the post and on this brace, can have its point depressed or elevated by setting the latter in a lower or higher notch. Behind the post a strong spring of wood or steel is fastened, at the bottom, and set by drawing the upper end downwards and backwards by means of a winch, so that when this upper end is let loose, the spring flies up and strikes with great violence against the arrow, thus driving it forth. Such springels drive arrows of six to eight feet in length, and of considerable weight, to several hundred paces' distance.

With the invention of gunpowder the whole warfare changed, and an entirely new weapon came into use, the firearm, which, being effective at

great distances, very soon completely superseded all projectile engines before employed. It must not be supposed, however, that the firearm received at once the form in which we find it at present. At first they dreaded the enormous force of the powder, whose limits they knew not, and believing it impossible that tubes so thin as the barrel of a musket could offer sufficient resistance, they employed only great pieces, and made these of unwieldy strength. After Berthold Schwarz had observed accidentally in 1280 the explosive force of powder, of which the composition had been made known by Roger Bacon as early as 1219, it soon began to be employed for military purposes, and already, in 1328, they had cannon in France. These first cannon were called Bombards (*pl. 34, figs. 18, 19*), or, when very short, and with a very wide mouth, mortars (*figs. 15, 22*). Bombards were at first of wood, bound with iron hoops, and lay upon a roller-carriage (*fig. 19*); then they were lined with iron-plate, strengthened with bars of iron running lengthwise the barrel, and bound with iron hoops. But, as even this could furnish no abiding resistance to the force of the powder, they constructed them entirely of forged iron, of cast iron, and at last cast them of bronze. Gustavus Adolphus, during the Thirty Years' War, had very light pieces constructed of iron plate, strengthened with bands and bound with hoops of iron, and covered with leather, whence arose the fable of the king's leathern cannon. Mortars were made at first of wooden staves, like casks (*fig. 15*), and fixed immovable upon the bed, as even now, at sieges, stone mortars are made, by hooping casks with iron, burying them in the earth, and kindling the charge from the muzzle. The bombards lay either upon fixed beds (*fig. 17*), upon roller-carriages (*fig. 19*), or, after they were made by casting, and became less unwieldy, upon a kind of frame especially for that purpose, which permitted changes in their elevation (*fig. 18*). All these bombards or mortars shot only stone balls or fragments of iron, and not until the year 1400 were iron balls used. Sforza had, before Piacenza, in 1447, three bombards; each of which discharged, in the twenty-four hours, sixty stone balls, and with which, in thirty days, he battered down two towers and the wall between them. In the year 1553, stone balls were still employed. The first bronze cannon were cast in 1418, and they have still, at Toulouse, a cannon cast in 1438, which throws a seven-pound ball, and weighs 1,356 pounds (our present six-pounders weigh, on the average, 900 pounds). Cannon were made at first disproportionately strong at the breech, as the 45-pound battering-gun represented on *pl. 34, fig. 20*, shows. Subsequently the pieces were made weaker and disproportionately long, from a belief that the longer the gun the more effective and certain was the shot. About this time also the movable carriage (the stock carriage) (*fig. 21*) was invented, by which the gun could be aimed in any direction, and on which it could more easily be served and transported. In this manner a kind of field-artillery was formed, of as small calibre even as two pounds, and with iron balls; while the huge wide-mouthed cannon, throwing stone balls, were used for sieges as late as the sixteenth century. It had been found out meanwhile that for stone balls a less charge was required, and that this was most effective when closely confined; whereupon, the part in which the

charge was placed was made of smaller diameter (*fig. 16*). From these stone-pieces was derived the form of the mortar and the chambered guns of modern times, the ancient ones having in section (*fig. 22*) a regularly curved bore, diminishing uniformly from muzzle to breech. For bursting gates, &c., the petard was used (*fig. 23*), as soon as it was found out that powder, when exploded, took effect in all directions alike, and gave, therefore, a recoil. Such a petard consisted of a thick plank, the *madrier*, which was secured fast to the gate it was desired to burst, and to this plank a metal pot, closed on all sides and very thick, was attached, and filled with powder; a slow match, communicating with this powder, gave time, during its combustion, for the person lighting the match to escape before the explosion, the whole force of which being directed by the thick metal pot against the gate, burst that open. Such petards are still used.

After the superiority of firearms to all other projectile engines came to be generally understood, the desire became active to construct them of such weight and dimensions that they should be portable and manageable by the single individual. This was effected only by degrees, and the first step was to make cannon of very small proportions and very long, but still requiring a light carriage; these were called wall-pieces or culverines (*fig. 6 a*). The great length of the bore and the unwieldiness of the carriage suggested the idea of loading these wall-pieces from behind. The first contrivance for this purpose was a breech-plate, which was screwed on after the charge was inserted (*fig. 6 b*), and the gun fired by means of a red-hot wire run through an orifice in this plate. This operation, however, consumed too much time; the touch-hole was contrived, and in the breech-plate itself a breech-screw was inserted, which could be screwed in after the loading was completed (*fig. 6 d*). Finally the tube and breech were made of one piece, and an opening cut through the upper part of the tube; through this opening the charge was introduced, and it was then closed by means of a strong grooved iron plug, in which was the touch-hole (*fig. 6 c*) and the piece discharged. All these contrivances, however, accomplished their purposes so ineffectually, and were so insecure and destructible, that they were soon laid aside, and instead the piece made lighter and shorter. The first improvement in this way is the swivel-gun, or field-hackbut (*fig. 7*), which was a kind of light field-piece, but was principally used on the walls of fortresses, and in other permanent positions. As our representation shows, the stand was a tripod which could be raised or lowered, and on the head of which a fork held the gun near the centre, while its breech was supported upon an arm which was movable around the tripod, and had at the extremity a directing screw. The part of the tube which held the charge was greatly strengthened to endure the force of the powder, to secure the gunner, and to throw the whole power upon the ball. To make the direction and the aim more certain, a sight was fixed upon this reinforcement, which was brought in line with the head on the muzzle and the object to be hit.

The next step in the improvement of firearms was the removal of the piece from the fixed stand, and the first attempt of this kind was the arque-bus (*fig. 9*). This had, instead of the carriage, a rather massive stock

with a butt behind, by which it was laid to the shoulder, and in front an off-set, by which it could be caught against the wall or a post, so as to break the recoil. The touch-hole was at the side, instead of above as before, and to secure the priming from falling off the pan was placed below it. The firing was effected by means of a match. As, however, proper supports were not always to be found, and it was desired to render the gun still more portable and effective for field service, the stock was made yet lighter (*fig. 8*), the butt more suitably formed, and the ramrod inserted in the stock. The point of support for this still very heavy weapon, was furnished by a fork at the end of a staff shod with iron, which the musketeer, for these weapons were called muskets, always carried with him and set up in the earth whenever he wished to use his piece. The touch-hole and pan were on the left side, so that the musketeer, while he held the weapon in its rest against the shoulder with the right hand, could fire it with the match held in his left. The next improvement was the invention of the lock. The musket had been so much lightened that the musketeer could use it, held in both hands, without the prop or rest (*fig. 10*) ; but as he could not manage the match with his left hand, since that was required in taking aim, it became necessary to attach it to the piece itself. For this purpose the touch-hole was brought once more to the right hand side, and a match so placed near it, that with the right hand it could be conveniently pressed down into the pan. The most ancient match-lock is represented (*pl. 34, fig. 11*). The match-holder turned upon a pin in the lock-plate, and had below a prolongation which formed the trigger, and which when pressed downwards by the thumb of the right hand brought the match into the priming. A small spring pressed the match back again when the priming was kindled. Afterwards the lock was differently formed (*fig. 12*), a simple slide being introduced, which caught on an off-set on the match-holder and moved it so as to bring the match into the priming or push it back. Meanwhile the match was perceived to be very imperfectly adapted to the purpose for which it was here employed, for if it was not withdrawn quick enough after firing, or if its position was not exactly right, the blast of the priming, with that from the touch-hole, would blow off the coal and thus extinguish the match. This difficulty led to the invention of the fire-lock. The first attempt of this kind was the wheel-lock (*fig. 13*), which was suggested by the fact that flint and steel struck rapidly and forcibly together would give out sparks capable of igniting gunpowder. A steel disk was added to the lock, which was connected with a spring in such a manner, that when the spring was set and the trigger pressed the disk made a sudden and rapid revolution ; a flint was now applied by means of an addition for that purpose, the cock, so that it could be pressed against the steel disk at pleasure. The moment the lock was set in action the flint struck off small fragments from the iron disk, which, being heated red-hot by the friction, fell into the priming and kindled it. An improvement on this lock was made (*fig. 14*) by not connecting the disk immediately with the spring; but by means of a chain, so that the spring could open further, and the disk performing a whole instead of half a revolution, was thus longer in contact

with the flint, and thereby the firing rendered more certain. The disk was at the same time placed higher, and was thus less liable to become foul from the burning of the powder. The cock also was provided with a spring, which, when the flint was once brought in contact with the disk, kept it there firmly during the whole revolution. The trigger was easily arranged, but the disk was wound up by a particular key for that purpose.

MODERN TIMES.

The more evident became the great advantages to be derived from the use of artillery in the field, and that to employ it there effectually it must have the utmost possible lightness and mobility, the more entirely were the former enormous calibres abandoned (for the earlier cannon threw 56, 48, and 36 pounds of iron), and a lighter artillery created, in which the loss of weight in the shot was compensated by greater rapidity in the shooting. Gustavus Adolphus, Louis XIV., Frederick II., who created the flying artillery; Napoleon, who by the employment of artillery in large masses decided his battles; are names which designate whole epochs, at once in the history of war and artillery.

1. *Artillery and Carriages.*

At present the artillery in common use is composed of cannon, howitzers, and mortars, which differ from each other in outward appearance and still more in internal form. Cannon have a length of from 16 to 20 times the diameter of their ball or their calibre; howitzers are from $4\frac{1}{2}$ to 6, and mortars from 3 to 4 calibres in length. From cannon, balls are thrown in a direction nearly horizontal; from howitzers, shells, at a small angle; and from mortars, bombs, at a great elevation. The internal form of mortars and howitzers differs from that of cannon by their being made with a chamber, that is a part smaller than the bore of the gun, in which the comparatively small charge is placed (*pl. 36, figs. 19, 20, 24, 26, 28*). In modern times it has been discovered that howitzers can be used without chambers also with equal effect. Particular kinds of gun are the unicorns, schuvaloffs, and carronades, of which we shall speak hereafter.

a. CANNON. Cannon are distinguished from each other by the weight of the ball which they throw, and these are, 1-, 3-, 4-, 6-, 8-, 12-, and 24-pounders. The inner cavity of the gun (*fig. 14, a b c d*) is called the bore, and at the part where the charge rests, the base or breech *c d*, it is more or less rounded. The hinder part of the cylinder, *A B C D*, is called the first reinforce; the middle part, *C D E F*, which contains the dolphins and the trunnion *L L'*, the second reinforce; *E F G H*, the chase; *G H I K*, the muzzle with the mouth. The thickness of metal decreases from the breech to the mouth, from one calibre to half a calibre, and this diminution is by stages; each reinforce is connected with the adjoining by some architectural member which is called a frieze (moulding), and distinguished according to its

position, as a base moulding, &c. The form of a truncated cone is also given to guns (*fig. 3*). Behind the first reinforce the gun receives a reinforcement which is called the cascable, with its knob and neck, the latter serving to facilitate the handling of the gun. *Pl. 36* shows the different cannon of the principal powers, arranged according to their calibres, and the scale which is annexed gives the means of learning all the details of the ordinary construction. *Fig. 2* shows a Bavarian 3-pounder. Of 6-pounders, the Saxon is shown in *fig. 3*; the Prussian, *fig. 4*; the Austrian, *fig. 5*; the Russian, *fig. 6*; the French, *fig. 7*; the English, *fig. 8*. *Fig. 9* is a Spanish 8-pounder; *fig. 10*, a French. *Fig. 11* a Prussian, and *fig. 12* an Austrian 12-pounder. *Fig. 13* a short French, and *fig. 14* a Russian 24-pounder. And of the balls, *fig. 38* shows a 24, *fig. 39* a 12, *fig. 40* an 8, and *fig. 41* a 6-pound ball.

The weight of guns is usually in the proportion of 150 pounds to each pound of ball for light, and 200 pounds for heavy guns, with a charge of from $\frac{1}{3}$ to $\frac{1}{2}$ the weight of the ball. Field guns are from 16 to 21 calibres in length, siege and garrison guns as much as 24 calibres.

Near the end of the bore is placed the vent (*fig. 14 f*), sometimes perpendicular, sometimes oblique to the axis. The base-astragal (or ring) and muzzle give the points of direction, by means of which the gun, which is movable upon the trunnions in the carriage, can be brought in line with the object aimed at. As the thickness of metal is materially less at the muzzle than at the breech, the moulding on the muzzle, or swell of the muzzle, is of considerable height, and upon it a small knob of metal (the dispart) is fixed, in line with a notch cut in the base-ring, and at such a level, that, when this knob, the notch on the ring, and the point of aim are in the same line, the shot will, at a certain known distance, 800 paces, for example, for 6-pounders, exactly hit the point aimed at. For greater distances a greater elevation must, of course, be taken, *i. e.* the breech-sight must be depressed with respect to the dispart, the degrees of variance from a due level being regulated by means of a movable piece (*fig. 32*) set upon the base-ring. This is cut out at *bc* to fit the ring, and pierced with holes at every quarter of an inch. The scale *ad* shows the distances to which the holes correspond, so that by looking through the proper hole and bringing the dispart (fore sight) in line with it and the object, the ball will strike at the distance required. More recently this hausse (movable sight) has been let in to the base-ring (*fig. 33*) and the breech-sight set upon it, so that by sliding up the stem of the hausse according to the distance, for a 6-pounder at 1000 paces one inch for instance, and there clamping it by means of a screw, aim can be taken more conveniently than when it merely stands loose upon the base-ring. The piece is discharged by applying the match to the vent, yet fire-locks have been applied (*pl. 36, fig. 34*), with cock *a*, and battery *b*, and in modern times percussion-locks. Both are sprung by means of a cord.

An uncommon species of gun is shown at *fig. 1*, viz. the 1-pounder cannon of Bernay, a newly invented hand-gun which requires no carriage. Upon a light stand, *b*, rests the lever, *d g*, which serves for handling the gun

and is held under the arm by means of the handle, *g*. The piece itself does not weigh quite one cwt., and the recoil is broken by the interposition of a strong bent spring, like the spring of a carriage, at *d c*, by which the shock is received and paralysed, while the band, *a*, which connects the neck of the cascable with the lever, slides to and fro in the slit, *e f*. The Count von Bückeburg had invented, indeed, in the preceding century, for the mountain warfare in Spain, a 1-pounder cannon, which could be fired without unlimbering (*pl. 38, figs. 4, 5*).

b. HOWITZERS. Howitzers are distinguished either by the weight of a stone ball which fills their bore, or by the diameter of the iron shell which belongs to them, the howitz, which usually, however, although it is hollow, weighs as much again as the solid stone ball. Thus, for example, a $5\frac{1}{2}$ inch howitzer throws a howitz which weighs from 14 to 15 pounds, and is $5\frac{1}{2}$ inches in diameter. The solid stone ball, however, which would fill the bore, weighs only 7 pounds, so that the expressions 7-pound howitzer and $5\frac{1}{2}$ inch howitzer imply the same thing. This double method of nomenclature holds also for mortars, the 50-pound mortar, for instance, holding a 50-pound stone ball, which has a diameter of 12 inches, so that a 50-pound or 12-inch mortar throws a bomb of about 100 pounds' weight of iron.

The external parts of the howitzer resemble those of the cannon and receive the same names, but the bore has a different form. This is shown most plainly by the dotted line in *pl. 36, fig. 24*. As the charge is very small in comparison with the size of the shot, it has been compressed into a small space and a chamber made for it in the breech, terminating in a hemisphere. The forward part of the bore, the chase, receives the shell in loading, unites with the chamber by a segment of a sphere, and is called the seat of the shell (kettle). From thence to the mouth the bore is cylindrical, and is called the "vacant cylinder." The chamber is cylindrical, the seat sometimes conical. On the second reinforce are the dolphins and trunnions. The length of the howitzer is determined by the length of the human arm, as the charge and shell are placed in the chamber and seat by hand, and the fuse must be adjusted in the same manner there. Accordingly the 7-pound howitzer is, in general, about six calibres, the 10-pounder about five and a half calibres in length. As to the weight of the howitzer, the proportion usually given is 50 pounds of metal for each pound of iron in the shell, whence the 7-pound howitzer will weigh 50 times 15, or 750 pounds. *Pl. 36* shows various forms of howitzer. *Fig. 19* is a Bavarian, *fig. 20*, an Austrian, *fig. 21*, a Prussian 7-pound howitzer; *fig. 22*, a French 6-inch, *fig. 23*, an English $5\frac{1}{2}$ -inch, and *fig. 24*, an English 8-inch howitzer. *Fig. 37* is the section of a shell or howitz; *fig. 36*, a Paixhans howitz; and *fig. 35*, a fire-ball. These last are strong spherical frames with iron ribs, which are filled with combustible matter and wrapped in tow cloth; they serve to set buildings, &c., on fire when thrown among them. In order to light up the country at night, balls of this kind are thrown filled with clear, white-burning light-composition.

A particular species of howitzer is the unicorn (*fig. 15*), used by the Russians, and of various calibres, but mostly 10- and 20-pounders. They

have only one dolphin, whence their name. They are, however, from ten to eleven calibres in length, whence they shoot with more accuracy than the others, and have no cylindrical chamber, but run conical from the beginning of the seat. The vent runs in obliquely, and the base mouldings are cut off on the under side. Another kind of howitzer was invented by the Russian General Count Schuvaloff in 1746, and called from him Schuvaloffs, of which *fig. 16* is the side view and *fig. 17* the horizontal section. The bore, instead of a cylinder, was an oval with the long axis horizontal, and was designed for giving a greater lateral spread to grape shot than usual. They were kept a secret, and were, therefore, not oval at the muzzle, but rounded, so as to appear externally like any other howitzer. They did not, however, produce the expected effects, and were soon abandoned. Other powers had long howitzers also, the so called shell-pieces, as, for example, the Saxons, and these with the Russian unicorns suggested to the French Colonel of Marine Artillery, Paixhans, the idea of his bomb-cannon. This is a kind of very long howitzer (*fig. 18*) with conical chamber, which exists in various calibres (our plate shows an 8-inch). From these solid shot as well as shells can be fired. Their fire is more certain than that of the common howitzer, and their effect very great. They were first employed at the siege of Antwerp, where also Paixhans' great mortar, constructed upon similar principles, was used.

c. **MORTARS.** Mortars are in all respects very similar to howitzers, save that their trunnions, since they are only designed to discharge shot at a very great elevation, are not in the middle, but quite at the hinder end; there are some, indeed, which have, instead of trunnions, only a cast foot, and which can, therefore, be fired only at one angle. Internally the mortar is divided like the howitzer, but the chambers have many different forms. The common chambers are the cylindrical (*pl. 36, fig. 25*) and the conical (*fig. 29*), but there are some pear-shaped, the narrowest part in front, and some spherical. The two last, however, being ineffective, are at present very rare. Externally the mortar is divided (*fig. 30*) into the breech I, with the trunnions G H, the reinforce G H E F, the second reinforce E F C D, and the muzzle A B C D. On the second reinforce stand the handles or dolphins. Mortars are shorter than howitzers, usually not more than three calibres long, in order that the bomb may be introduced conveniently. The mortar of Paixhans, however, was very much longer, to give a greater range. In the weight of mortars the proportion is usually 15 to 20 pounds of metal in the piece to each pound in bomb, so that a 30-pound mortar weighs 60 times 15, or 60 times 20, *i. e.* 900 or 1200 pounds. *Fig. 25* shows a Prussian 50-pound mortar; *fig. 26*, an Austrian 30-pounder; *fig. 27*, the same after Vega's construction, with conical chamber and the trunnions a little advanced; *fig. 28*, the French 10-inch mortar; *fig. 29*, the Gomer mortar with flat conical chamber and trunnions E C on the second reinforce; *fig. 30*, an English mortar.

d. **CANNON AND HOWITZER CARRIAGES.** The frame upon which the piece is placed for use and for transportation is called its carriage; the gun is attached to it by means of the trunnions, and it is fitted also with all the

implements requisite for the service of the piece. For cannon and howitzers the carriages have throughout the same form, and consist, in most armies, of two cheeks, A A (*pl. 37, figs. 1, 4*), which are formed partly in straight and partly in curved lines, and broad at the foremost end, the "breast," and growing narrower as they run back terminate in a curve, the "trail," so that they may glide more easily over the ground in the recoil. Besides the axle-tree, these cheeks are held together by several transoms, of which the foremost is called the breast-transom; then comes the centre-transom, and last the trail-transom, in which is the "pintle-hole" (*fig. 6*, the dotted line at *b*), and the rings, *a a*, for the insertion of handspikes, to move and guide the trail. Previously there had been a fourth transom, behind the axle, the travelling-transom, upon which the breech was let down when the piece was being transported. The cheeks are plated all round with iron bands, to secure them from splitting and give them more solidity, and through the transoms run screw-bolts, to keep the cheeks together. For the trunnions there are iron trunnion-plates, which are closed with iron trunnion caps, fastened with key-bolts. Between the cheeks is the directing or elevation apparatus, of which we shall speak below. The English at present, and also the French, have the stock-trail, or block-carriage. In this the carriage proper (*pl. 37, fig. 18*) is a beam, A, to which in front two short cheek pieces, B, are secured for receiving the trunnions. As the trail-transom is here wanting, and the trail itself is very narrow, a strong iron ring is secured to it (*fig. 1, B*) through which the pintle-bolt passes when limbered up.

Fig. 1 shows the side-view, *fig. 4* the upper-view, of a Bavarian field-piece. A is the cheeks; B is the trail-transom, which has here no pintle-hole, but a pintle-ring; C, the two handspikes for direction, which are attached with a hinge, and when not in use turned back between the cheeks, or else laid in two rings for the purpose on the transom (*fig. 4*). The rammer, *a*, with the sponge, *c*, on a staff, *b* (*fig. 31*); the worm, *c*, with spindle, *a*, and screw, *b*, for drawing the charge (*fig. 32*); and the "tire-sabot," *a*, with the toothed ladle, *b*, for adjusting the ball in the bore (*fig. 33*), are all, when not in use, attached to the carriage by iron fittings for that purpose. E, *fig. 1*, is the elevating-screw; F, a ring for hooking on the water or tar bucket, and the bricoles. *Fig. 6* is a Bavarian seven-pound howitzer, with cheeks partly removed, A; B is the store bed, C the elevating screw, D the centre-transom with the female screw, E hooks for implements and for the bricoles; *a a* rings for the handspikes (*figs. 29, 30 a*, with *b*, hooks for hanging them on the cheeks), the dotted lines near *b* mark out the pintle-hole, and at one end of the same plate is a hook for the bricoles in moving backwards; *c*, hooks for sponge, handspikes, &c.; *d*, draw-bolts, *ff*, keys for the cap-squares. *Fig. 10* is a French twelve-pounder, with block-carriage, newest pattern. A, trail block; B, attached cheeks; C, implements of service; D, water bucket; E, locking plate; F, coiled prolonge; G, elevating screw. *Fig. 18*, French twenty-four pounder, heavy field gun, on block-carriage: A, trail block; B, cheeks; C, elevating-screw; D, lifting-bar, for limbering up; E, drag-chain.

Between the cheeks, or on the axle-tree of the field-carriage, is placed a

small chest for implements and a few rounds of fixed ammunition, ball and grape. Garrison carriages are not designed to be moved any great distance; they can be, therefore, and for heavy calibres of garrison guns must be, very much stronger and heavier. For the same reason they require either no wheels at all or very small ones. The simplest garrison carriage is the rampart-carriage of Gribeauval (*pl. 38, fig. 1*). It consists of two strong cheeks connected by the bolts *q, d, k*, and can be moved backwards and forwards on the platform, on the block-wheels *r s*, by handspikes in the rings and hooks, *h, l*. These carriages are so low that the piece on its trunnions only just clears the sole of the embrasure. To fire "en bache," however (that is over the crest of the rampart, without embrasures, so that the piece ranges freely in all directions over the superior slope), a higher carriage is used, the travelling garrison-carriage of Gribeauval (*pl. 37, fig. 11*, is the side-view, *fig. 12*, the rear view, and *fig. 13* is the carriage placed upon the platform-wagon for transportation). *A* is the cheeks, made up of the three blocks *a b c*, scarped together and connected by bolts and transoms; *B*, the elevating screw; *C*, a support in which the block-wheel, *D*, runs upon a separate beam, *H*, of the chassis *I*, its track sloping upwards as it gives back, to diminish the recoil; *E* is a bar for moving the piece backwards and forwards; *K*, the fore wheels, with thick tires, *G*, and the axle *Q*. For transportation, a long beam, *L*, with a pintle-hole, is inserted into the carriage and put over the pintle-bolt, *M*, of the limber, *O*, of the platform-wagon, so that the wheels, *P*, make the fore wheels of the carriage. The chassis upon which the carriage runs behind the embrasure consists of two side-sills, two head-sills, and a middle-sill, *H*, for the truck-wheel, *D*; it is moved from one side to the other on the platform, as the direction requires. Of similar construction is the French iron coast-carriage (*fig. 16*). For this there lies, behind the breastwork, a small platform, *A B*, upon which in rear is the curved piece *C*, for the truck-wheel, *G*, to traverse on, and in front a broad sill, *D*, for the fore wheel, *M*. The traversing platform (chassis), *E*, revolves around a bolt in the front part of the platform, *A*. This traversing platform has a groove on each side in front, in which the cheeks of the carriage proper can slide back for the recoil; it is itself made to traverse by means of the beam, *F*. The carriage consists of the uprights, *H*, which are united to the bed, *K*, by means of the brace, *I*, and which support the trunnion beds. *L* is the elevating-screw. Another garrison-carriage for use in casemates is the invention of Montalembert (*fig. 14*, side, *fig. 15*, upper view). The chassis, *A*, is higher behind to check the recoil, and traverses upon a circular platform by means of the truck-wheel, *B*, and upon the sleeper, *E*, by means of the lever, *I*; the low cheeks, *D*, run by means of the truck-wheels, *C*, and a small wheel lying under the beam, *G*, backwards and forwards upon the chassis, *A*; *H* is a transom near the wedge of the elevating-screw. The truck-wheel, *C*, is shown in *pl. 37, fig. 21*, and it is seen in what manner it is made up of six wedges, *a*, held together by the tire, *b*; at *c* is a ratchet-wheel, which is caught by a panel on the carriage, so that, after recoiling, the piece is kept stationary until it can be loaded. For the service of the piece the rampart sponge and the rammer.

with a handle bent backwards (*fig. 34 d*), and connected with the staff by the mounting, *c*, are employed. For fortifications where it is necessary to fire downwards, as in Gibraltar for instance, the depression carriage of Köhler is employed (*pl. 38, fig. 2*, side view, *fig. 3*, from above). Upon the platform, *ff*, which can be moved sideways by means of rollers, *h*, runs, on four wheels, *g g*, the carriage proper, whose lower frame is bevelled off in front, and has two arches, *i*, in rear, by means of which the upper frame, *ee*, which is also bevelled off in front at *d*, can be set at any angle. Upon the upper frame lie the cheeks, *a b l*, on which the piece, *c*, rests upon its trunnions, and which are bound together by two cross-pieces and bolts into a frame; the whole is of iron.

A peculiar carriage was invented by Count von Bückeburg already mentioned. for the one-pound amulette, which can be fired from without unlimbering (*fig. 4*, side view, *fig. 5*, view from above). Upon the high edges rest the two beams, *a b*, bound together into a frame, between which are the bench, *c*, and stand, *d*, for the artillerists, and upon which the platform, *ef*, lies. Upon this are the low cheeks, *g h*, with the transoms, *i* and *n*; on these cheeks the trunnions rest. Upon the front carriage, *o*, which is a limber with a pintle for the pintle-ring on the lower frame, stands an ammunition chest, *n*.

e. MORTAR CARRIAGE OR BED. For mortars which have their trunnions on the second reinforce, the so called hanging mortars, the carriage consists of two cheeks connected together by bolts and transoms. After the inefficiency of this construction was perceived in various armies, and instead of the hanging, the standing mortar was introduced, the carriage consisted only of a short massive block of oak wood, or of two or three very thick oak planks, screwed together by means of strong iron bolts passing through them and secured by surrounding bands. Upon this bed is hollowed out the place for trunnion beds and for the foot of the mortar. *Pl. 37, fig. 8*, is a Prussian 50-pound mortar upon its bed, *A*, which is composed of two very thick planks and three very short transoms. Besides the two bolts, *aa*, the four bolts which pass through the iron band serve to hold the bed together. The lower corners of the bed are notched in and rounded, to permit of handspikes being thrust under for moving it upon the platform, and there are also hooks, *bb*, to be made use of in curving the bed sideways, or to secure it in transportation; *B*, are the trunnion plates and cap squares, which are fastened round the trunnions, by key bolts; *c* and *d* are quoins for elevating the mortar. *Fig. 17* is a French mortar on its bed, which consists of two thick cheeks of cast iron, *A*, set upon the wooden sleepers, *B*, and firmly united by means of transoms and bolts; the pins, *aa*, of which there are four, are employed in giving the direction and securing the mortar; *B* are the cap squares, and *C* is the quoin. *Fig. 7* is the side view of an Austrian 30-pound mortar, after Vega's construction: *A* is a bed composed of three oak blocks united by screw bolts, and having iron studs at the angles for giving the direction and moving the piece. Upon this bed, two low iron cheeks, *B*, are fastened by means of bolts, and form the trunnion beds, which are closed by the cap squares, *F*. On the

trunnion, *D*, of the mortar, an index is fixed, which shows, upon a circular scale attached to the bed, the angle of elevation; *a*, is the pivot bolt for the stool bed, *b*; and *c*, the directing screw, the head of which fits into the stool bed, *b*, while the female screw in which it plays lies in a movable transom between the low cheeks. *Fig. 22* is a side view of the stool bed: *a*, is the socket for the spherical head of the directing screw; *b*, the cushion for the mortars; and *c*, the hole for the pivot bolt.

A peculiar kind of mortar bed is that for the sea mortar (*pl. 38, fig. 6*, side view; *fig. 7*, upper view; *fig. 8*, cross section on the half scale). These beds are composed of two layers of oak beams, *ff* and *ee*, each pair breaking joints and bound together with the belts, *gh* and *i*. The studs, *ff* (*fig. 7*), serve for giving the side direction. Upon this bed lies the iron sole plate, which, by means of screw bolts through the disk, *x*, and by the screws of the rings, *ekno* (which are for securing the mortar by ropes), is fastened to the bed proper. In this sole plate the trunnion beds are sunk, and the cap squares, *m*, secured upon them by key bolts. The sole plate and bed are hollowed out at *t*, for the mortar and quoin. The whole bed stands, by means of a groove, upon the circular iron platform, *ab*, and is so connected with this by the pivot bolts, *d* (*figs. 7 and 9*), that both can revolve around it for the side direction. The pivot bolt is secured into one of the beams of the ship.

f. THE ELEVATING SCREW. With cannon and howitzers, the muzzle must be movable through a curve of ten or fifteen degrees, in order to give the necessary elevation or depression for the aim; for mortars, the elevation amounts even to sixty degrees. To effect these movements with the requisite accuracy and rapidity, the elevating screw is employed. The most simple means of accomplishing the purpose is by the quoin or wedge, which was formerly used for cannon and howitzers by moving it in or out under the base-ring. At present this is used only for mortars (*pl. 37, fig. 8*), and for them three are employed. Under 15° elevation, the mortar lies upon the bed; the first quoin gives 25° , the second, 30° , and thus with the third 45° or 60° can be given. The screw quoin is better, indeed, as it admits of more accuracy in the elevation; but this, on account of its slowness, is used only for garrison pieces. *Fig. 25* shows the section of such a quoin: *a*, is the wedge upon which the base-ring rests; *b*, is the stool bed lying between the bed cheeks, upon a groove in which the wedge moves by means of the screw, *d*, which works in the female screw, *c*, firmly fixed in the stool bed. The quoin of the Montalembert carriage is similar to this, save that the screw in it is fixed and the female screw set in the wedge, which is thus moved to and fro by turning the screw (*fig. 26*, side view of this quoin; *fig. 27*, longitudinal section; *fig. 28*, front view). *A*, is the quoin; *B*, the screw, which is turned by the winch, *C*; to the quoin the plate, *D*, is fastened, which holds the thread of the female screw, and is opened when the screw is to be taken out. Another kind of elevating apparatus is that with a windlass (*fig. 20*), which was used for the Saxon park cannon. The stool bed, *B*, which moves between the carriage cheeks, *AA*, has two wings, *aa*, in front, by which it is attached to the trunnions,

and behind, running downwards, two studs, to which the chains, DD, are made fast, which, by turning the winch, E, are wound upon the roller, C, just in front of the middle transom, F, and thus the stool bed with the breech of the piece resting upon it, is either raised or lowered. Instead of the studs, curved racks have been used, and pinions placed on the axle, C, thus avoiding the use of the chains. On the windlass there is always a ratchet wheel and parol to hold the direction.

The best and simplest elevating apparatus is the elevating screw (*pl. 37, fig. 23*). The stool bed revolves upon bolts in the carriage at *g*, and has beneath an iron groove plate, *e*, under which the screw head, *d*, catches. This screw is turned by the wrench, *bb*, and works in the female screw, *a*, which is placed in an iron transom for that purpose, revolving on sockets in the carriage cheeks (*fig. 24*). *Fig. 6* shows clearly the whole arrangement. A variety of this apparatus is where the female screw has arms and lies loose upon the pierced transom; in this case the nut is turned, while in the other it is the screw. The elevating screw of the Bavarian 3-pounder (*figs. 1 and 5*) is similarly constructed, but has no stool bed (as indeed is the case at present with the French artillery); the head of the screw passes through the knob of the cascable, and is turned by the winch, *a*; the female screw is at *b*, and movable upon the carriage cheeks.

g. THE LIMBER. To move a piece of artillery from one place to another, two more wheels must be added to the two upon which it stands. This is done by means of the limber or front carriage. There are limbers without, and limbers with boxes. The first consists only of an axle, upon which lies a bolster, bearing a pintle bolt (*fig. 13 mno*), over which the trail of the piece is hung. In front is the pole with its parts. Limbers with boxes serve for the transportation at the same time of the most necessary munitions and of some of the gunners. In general, the limber forms a common fore carriage, with all its parts, on which stands in rear a bolster with the pintle bolt, and in front, upon the axle, the limber box. In the position of the pintle bolt there are some variations. In the Prussian artillery and several others, the pintle is a straight conical bolt, and the pintle hole larger above than below. In pieces on the plan of the Bavarian Col Zoller (*pl. 38, centre figure*), the pintle is the same, but the sweep bar of the limber falls away, and the pintle hole is peculiarly constructed, so as to give the greatest freedom of motion in the junction of the limber and carriage for overcoming difficulties of ground. For pieces with the block carriage, instead of the pintle hole a hook is requisite (*pl. 37, fig. 19 a*), in which the ring of the trail is hung. With respect to the limber box, there are also great differences, as we shall see in the descriptions of single limbers. *Fig. 2* shows the limber of a Bavarian 3-pounder from the side, and *fig. 3*, from the rear: E, is the perch with the sweep bar, *bb*, and the shaft, between the arms of which lies the pole; A is the axle-tree body, with the two wooden arms, BB, which at *aa* are cased with iron, and on which run the wheels, G; *e* is the pintle, over which the ring, B, of the carriage is hung (*fig. 1*). Upon the axle and the shaft stands the limber box, F, which at D is cushioned, and forms a seat for two artillerists, for whom a back

and arms, *dd*, are attached to the supports, *cc*. The cushioned seat is at the same time the cover of the limber box, in which the most necessary munitions are carried; at *C* stands another box for implements. The English limber (*fig. 19*) has no sweep bar, and the pintle hook, *a*, is on the axle-tree bed. The axle, *DD*, is of iron, and the wheels, *CC*, are as high as those of the carriage (5 feet). Instead of one large limber box there are here two smaller ones, *AA*, which are not screwed down upon the bed, but only lashed to it firmly, whereby great facility is given for the renewal of munitions. *Pl. 36, fig. 31*, shows an English 6-pounder field-piece, limbered up and completely equipped. The gun boxes stand here upon the axle-tree of the piece. The French limber (*pl. 38, fig. 10*) has likewise for block carriages no sweep bar, but only a pintle hook, otherwise a limber bolster and pintle bolt. The limber box occupies the whole breadth between the wheels, and has high handles at each end, which serve also for the artillerymen to hold on by.

h. WAGONS. For the transportation of mortars and 24-pound guns, as these cannot be transported upon their carriages, the gun-wagon (*chariot à port corps*) is employed. For cannon these have only three sleepers on the frame, under the muzzle, trunnions, and breech, the middle one having trunnion beds closed with cap squares; the piece is lashed besides. Small mortars remain on their beds, and two of them are transported on the wagon; the large mortar requires a wagon to itself. *Pl. 37, fig. 9*, is a gun-wagon for a Saxon 30-pound mortar. Upon the common, stout wagon, *A*, with four wheels, *C*, lies the frame, *B*, upon which, over the hind-axle-tree, the mortar bed, *D*, is fast lashed. For the mortar, *E*, wooden trunnion beds are fitted, which are closed with cap squares; the mortar itself is also strongly lashed.

Ammunition wagons (*caissons*) serve for the transportation of a certain quantity of munitions, and each piece has one, each howitzer two of these, belonging to it. For most artillery this species of wagon is constructed as shown in *pl. 38*, where *fig. 11* is the side view, *fig. 12* the upper view, and *fig. 13*, the rear view of a French 4-pounder caisson. The fore wagon, *B*, consists of the guides, *mm*, with the sweep-bar, *n*, the pole, *r*, and the axle, *l*, bearing the bolster, *b*, for the frame, *ad*, which rests on the hind axle, *y*, by means of the bolster, *L*, and the axle-tree bed, *e*. Fore and hind wagon are connected by the perch. From the frame hangs the drag-chain, *cc*. Upon the shaft rests the splinter-bar with the swingle-trees, *p*. The wheels, *gh* and *D*, run upon iron arms. On the frame-tie, *d*, and in a loop, *z*, under the bolster, rests the axle arm, *x*, on which a spare wheel is carried. Upon the frame is secured, by bolts, *q*, the ammunition chest, *A*, the cover of which is lined with iron plates. Entrenching tools and other materiel are transported in wagons of the same kind. Entirely similar to these caissons is the battery wagon. The new French caissons (*pl. 38, fig. 14*, side view, *fig. 15*, rear view, *fig. 16*, upper view of the fore wagon) are designed for the transportation of men also. The fore wagon is in all respects like a limber, and is connected with the hind wagon by means of a perch without a sweep-bar and shaft, upon which stand two chests in all

respects similar to the limber boxes, so that no transference of ammunition from caissons to limber box is necessary, but the full box is exchanged for the emptied one on the limber. A spare wheel is carried on the hind axle, as in the other caisson. The battery and store wagons (*fig. 17*) are chests with flat covers, resting on a frame which stands on the bed of the hind axle, and has a body bolt by which it is attached to the fore wagon.

The wagon for the transportation of bridge equipage (*fig. 20*, side view, *fig. 21*, upper view) consists of a fore wagon with chandelier and under-running wheels, and a hind wagon, Z. The frame, *a a*, is connected by the trunnions, *b b*, and bears the four sleepers, *c c c c*, upon which the pontoon is lashed by means of the rope, *d e*, after it is run up from behind over the roller, W. The winches by which the roller, W, is turned are at *p*; the draw-ropes winding on it at the same time, while the back part of the wagon is supported by the prop, S, dropped into the position, *k*. On the frame is also the drag chain and shoe, *e*. The fore wagon has, over the axle-tree bed, the riding bolster, P, which, by means of the guides, *g g*, upon which lies the sweep-bar, *t t*, and the ties, *h h*, is connected with the pole, Y.

The travelling forge serves to make small repairs and to do horse-shoeing at the time and place required. The Prussian travelling forge (*fig. 18*) has the under carriage of the caisson. Upon the forward axle stands the coal and tool box, upon the hinder the hearth with the back and nozzle, in front of which is the bellows. The anvil is placed on the ground. The French travelling forge (*pl. 38, fig. 19*) has, on the frame of the battery or park wagon, the coal box over the forward axle-tree, over the hind the bellows, and in rear of all a tool box. The anvil stands on the hearth for transportation, and is taken down for work.

For moving artillery short distances close to the surface of the earth the devil carriage is used. The simplest (*fig. 22*) is an axle-tree bed, *a*, with the guides, *l m*, between which one simple pole, with rings for fastening draw-ropes, is secured. In use, the devil carriage is brought over the gun, the pole raised, and the trunnions of the piece made fast to the bolster, then the pole is brought down to the ground and the cascable made fast to it. If now the pole is raised to the draught height, the piece will clear the ground about 6 inches, and can easily be transported. The compound devil carriage (*fig. 23*) has a screw, on which works a cross yoke with hooks, to which, when depressed as much as possible, the load is fastened, and then by turning the screw raised with little effort.

2. *Fabrication of Artillery and Projectiles, Balls and Bombs.*

Since the earliest and rudest construction of artillery, at the period of its first introduction, was given up, it has been produced only by casting, for the attempts in modern times to forge guns have thus far led to no practical results. At first the piece was cast hollow, over the core, or rod covered with clay to the size of the bore, placed in the centre of the finished mould and taken out after the casting. It was soon perceived, however, that the

interior surface of the bore thus obtained was always of a somewhat spongy texture, never exactly straight and cylindrical; and finally that the piece itself was injured by the iron anchor of the core rod, which remained imbedded in the breech. Meanwhile the methods of working in metal had improved, particularly the art of boring; the plan of hollow casting for guns was, therefore, entirely laid aside, all guns were cast solid and afterwards bored out to the proper calibre, whereby not only was the best metal brought into the region of the bore, but a piece was obtained which shot more truly and lasted longer. In the moulding itself two methods were followed: the loam moulding and the dry sand moulding, the last of which is more and more used. The metal of which guns are cast is either bronze, a mixture of 10 parts copper and 1 part tin, or refined and repeatedly melted iron.

a. LOAM MOULDING. This is so called because a mixture of loam and horse-dung is used to form the mould. For each mould the pattern must first be produced. This is done by laying a core staff on two trestles and winding it round with tow and old rope, keeping it all the while revolving, until the overlaying has nearly the shape and dimensions of the gun, which is judged of by a pattern board, laid before the workman, in which the profile of the gun is cut out. Then a layer of mould stuff is put on and dried, and so a succession of layers, which, however, are made finer and finer, until at last they consist purely of washed clay and water, wherewith a mould board, plated with iron, is used, in order to get the mouldings and other parts exact and true by turning them off against them. Each layer must be perfectly dry, wherefore a moderate coal fire is kept constantly going under the cylinder. The last layer is coated with a paste of loam, and over this a coat of wax dissolved in oil of turpentine is laid, and the pattern turned. Then the trunnions and dolphins, mounted in wax, are put on and the pattern is complete. Upon this the mould proper is made, the first layer of washed loam and clay and coarser stuff being employed by degrees. *Pl. 39, fig. 26*, shows the art and manner of forming the pattern mould for a 50-pound mortar which corresponds with the above described, with the distinction only, that they are formed standing, and that instead of the woolded core the rough mould is built up. That is, a circular hearth, *q*, is built, in the centre of which is the bed, *e*, for the mould spindle, and then the rough form of the pattern is begun with a round layer of bricks, *u*, in which air-holes are left; on this a cupola-shaped structure, *p*, having nearly the form of the mortar when standing on its muzzle, is erected of tiles cemented with loam. On the top is a tube, *p*, for the core spindle. The whole stands near a wall, to which the turning apparatus is attached. This consists of horizontal arms, *c*, which are fastened to the wall by means of ties, *f'*, and run together in the middle, *b*. An oblique tie, *d*, also fastened to the wall at *f*, runs likewise to the point of junction, which thus forms the vertex of an immovable triangle. From this point to the bed, *e*, in the hearth runs the spindle, *a*, whose upper end (*fig. 27*) lies in the collar, *b*, and is regulated by the fly-screw, *g*. About this spindle the mould board, *k k*, is turned, being suspended from the frame, *h*, which is attached to the

collars, *mm*, and held in its place by the oblique tie, *l*. The frame, *h*, has numerous holes, *ii*, by which the mould board can be placed as desired, and the oblique tie has slits, *ss*, corresponding to the slit, *k'*, in the mould board, so that it may be set by means of the screw, *t*. The height at which the frame, *h*, is placed is regulated by a collar at *o*. The screws, *n*, serve to fix it. The pattern being completed upon this turning machine, trunnions and dolphins are put on, and the mould itself is made. During the process a gentle coal fire is kept constantly burning inside the cupola. *Pl. 39, fig. 28*, shows the completed mould, the different layers being taken off in parts to exhibit the structure. Beneath the mould proper, *z*, we see an addition; this is the dead-head, and gives afterwards in the casting an overplus of metal, by means of which that contained in the mould is rendered more compact; in the boring process it is cut off. At the top we see another addition; this is designed to hold the mortar, *ly*, in the turning machine, and is likewise cut off. As to the layers in the mould, there comes first a coat of fine loam paste, *p*, then three coarser layers of mould loam, *y*, then an armature of iron bands perpendicular and horizontal, *w*, and finally the outermost layer of coarse mould loam, *v*. When the mould is finished and dry the pattern is broken to pieces within it and taken out by fragments, the trunnions and dolphins melted out, and the mould is then ready for casting.

b. DRY SAND MOULDING. With very different celerity and exactness goes on the modern process of dry sand moulding, first introduced by General Guillemin at Liège. In this a pattern of metal is employed, which is divided in such a manner that the different pieces which compose it can be easily taken out from the finished mould. *Fig. 5* shows the section of a moulded 6-pounder gun, and it is perceived that the pattern consists: 1, of a solid, conical piece of wood, *h*, mounted with rings, *ii*, and furnished with a ring-bolt, *k*; 2, of a pattern for the muzzle *mn*, with the muzzle mouldings *m* and *l*, which can be taken off; 3, of a pattern, *o*, for the chase with its movable rings and the draw-hooks, *xx*; 4, of a pattern *q* for the second reinforce, with the trunnion patterns *pp* screwed on; 5, of a pattern for the breech, *st*, with the base mouldings and the draw-hooks, *zz*; 6, of a pattern for the cascable, *u*, which can be united with the pattern 7, for the knob of the cascable and the turning-head *v*, by means of a screw-bolt, *w*. To each of these seven patterns belongs a mould-box also, although single pieces of the patterns project into other mould-boxes. These mould-boxes are seen in *fig. 4*, under the letters A, B, C, D, E, F, G, H; the mould-box D has besides the side boxes E E' for the trunnions. The mould-boxes consist always of two exactly equal shells, which are of greater diameter than the pattern by the sand thickness of the mould, and are provided with longitudinal and cross flanges, to connect the shells with each other and the mould-boxes together into a whole, by means of the key-bolts, *adb*. Each mould-box has handles, *ff*, for lifting it by the crane. Internally the walls of the mould-boxes are provided, according to *fig. 7*, with depressions, in order that the mould-stuff, when rammed in, may hold faster. The moulding process is as follows: First, the box G is placed with the broad side upon a bed, which

has marks for the right position of the pattern, *u*, and this is completely moulded, while the pattern *v* is united with it, and the layer of mould-stuff, composed of one part powdered coke and five parts of pit sand containing clay moistened with water, in which horse-dung, coke, sand, and pipe-clay are contained, is strongly rammed in all around, finally smoothed off accurately at the joints, and dusted over with a layer of powdered charcoal. Then the mould-box H is set on and the pattern *v* moulded, while the two ears which are represented in *figs.* 9, 10, and 11, are shoved upon the pattern of the turning-head, the sand-layer H' formed, smoothed off, and closed with the plate *c*. Then the completed part of the mould is set on the plate *c*, and, one after the other, the boxes F, D, C, B, and A are moulded, whereby the layers F', D', C', E', B', and A' are obtained. The moulding of the trunnions, *p p*, is done from the side, and the mould is closed by the plates *e e*. *Fig.* 22 shows the cross-section of the mould on the line A B, *fig.* 5, and here are seen the screws by which the trunnion patterns are fastened to the main patterns. The withdrawal of the patterns is done from above downwards. First, the box A is loosened and taken off, which from the coating of coal-dust on the joints can be done easily. The pattern, *h*, of the dead-head, is taken out from above, the pattern *b* from below, and the inner face of the mould is then examined and touched up where necessary. For this purpose the spatulas, *figs.* 20 and 21, the little trowels, *figs.* 12 and 13, the small disks, *figs.* 14, 15, and 16, and the larger oval disks, *figs.* 17, 18, and 19, are employed. The boxes B and C are easily freed from their patterns, but D contains the trunnion patterns. These are loosened from the main pattern by taking out the connecting screws, when the main pattern can easily be withdrawn, and afterwards the trunnion patterns are drawn into the inside of the mould and so removed. The boxes F and G, again, are easily freed, and at H remain, where the pattern *v* is removed, the two ears fast in the mould. These have, however (*fig.* 9), a small screw-thread in them, and by screwing a small spindle (*fig.* 8) into this, they can easily be pulled into the inside of the mould and so removed. If now the separate mould-boxes are well powdered and properly placed together again, the mould is ready for the casting. *Fig.* 24 shows the section of the mould of a 50-pound mortar with the patterns in; *fig.* 25, a cross section through the centre of the trunnions, to show how the trunnion patterns are taken out; *fig.* 23, a view of the complete mould. A, B, C, D, E, F, are the mould-boxes; A', B', C', D', GG, the patterns; E' and F', the layers of mould-stuff in the trunnion moulds; *a, b, c, d, e*, are key-bolts and wedges for fastening the mould-boxes together; *g*, the plate with bolts on the trunnion mould; *f*, the handles on the mould-boxes; *h*, the draw-hooks on the patterns for taking them from the mould; *i i*, the movable ring put on to form the muzzle moulding, which is taken off separately in drawing the patterns; *k k*, are the screws which hold the dolphin patterns and which are unscrewed in order to take them out; *l l*, are screws which hold the trunnion patterns during the moulding of the main pattern; *n* is the screw for the turning-head, to take it out more conveniently. After what has been already said of the moulding process and the manner of withdrawing the patterns from

the mould, nothing more is required on these subjects here, save a few words of explanation with respect to the manner of withdrawing the trunnion patterns. In moulding the trunnions, cylinders are at the same time imbedded in the sand layers E and F, at the centre of the trunnion pattern forming the hollows *uu*. The trunnion patterns have holes, *m*, with screw threads, one larger, one smaller. If now, after the screws *ll* are taken out, the chamber pattern is withdrawn, then a plate, *t*, with a hole in it, is brought in front of the trunnion pattern at E and a spindle *o*, of which there are two, fitting the large and small screw-thread; the one now referred to, being the smallest, is thrust through *u* and the trunnion pattern G, and screwed into the thread in the opposite pattern, F; the spindle, *o*, has a screw cut upon its opposite extremity also, on which works a wrench, *r*; by turning this wrench the spindle is drawn directly backwards, and thus the pattern F, into which its end is screwed, is drawn out from its mould. In exactly similar manner the other trunnion pattern is withdrawn, and then, in the retouching of the mould, the holes *uu* are filled up and the stopping-plates, *pp*, screwed on. The prepared mould is now carried to the pit of the foundry for casting, where it is either rammed in sand, or screwed fast upon a bed for that purpose and held by ties and braces.

c. THE FOUNDRY AND THE CASTING. The casting of cannon is made from the flame or reverberatory furnace, as it is called, whenever gun-metal, a mixture of copper and tin, is employed; and from the cupola furnace when iron guns are to be cast. In the former cast the metal flows from the tap-hole in the hearth, upon which it was melted by the reverberated flame, into the mould, which is placed perpendicularly in the pit immediately in front of the furnace. In the second case, however, the melted iron is drawn from the furnace in great kettle-shaped ladles and poured into the mould; yet casting in iron could be practised from blast furnaces adapted for the purpose, or even from peculiarly constructed reverberatory furnaces. Iron guns are cast at iron-works, where all the necessary apparatus for moulding, boring, and turning are already on hand; for bronze guns, however, a particular casting-house is constructed in the place where the artillery workshops are located, provided with all the requisite apparatus and the machinery for boring and turning. *Pl. 39, fig. 1*, is the longitudinal section along the line XY in the ground-plan (*fig. 2*) of a casting-house or cannon foundry, and *fig. 3* is the cross section of the same, through its principal spaces. A is the foundry proper and space for moulding the guns; B, the room for small mouldings, with a pot furnace for lesser castings. C is a large hearth sloping to the tap-hole; D, a smaller one, to be used when only one or two guns are to be cast; if both are used at once, from eight to ten guns can be cast at the same time. E is the pit; F, a drying oven for loam casting; G, the platform scales for weighing the metal and the guns when finished; H, the great crane, turning on a pivot, for moving heavy masses in the moulding process and for setting in the mould; I, the smithy; K, pattern room and dwelling of the director; L, furnace space; *a*, steps to the ash-pit; *b b' b''*, pipe for leading the air blast to the furnaces; *c*, drain to carry off water from the pit; *d*, wells; *e*, drain from the moulding-room; *f*, drain

pipe ; *g*, pot furnace ; *h*, chimney ; *i*, fire-bridge ; *k*, sole ; *l*, ash-hole , *m m'*, stoke-holes ; *n*, flue ; *o*, conduit.

The gun after casting is taken from the mould, and then is usually bored and turned at the same time, if the boring machine, as is now generally the case, is horizontal. When the boring is vertical, the turning is done afterwards. Previous to boring and turning, however, a bolt of hammered copper is screwed in where the touch-hole is to be. When the piece is bored and turned, the trunnions are turned separately, the part between the trunnions and the dolphins worked off with files and rasps, and finally the vent bored out. Before it is used the piece is subjected to the most careful proof.

d. CASTING PROJECTILES. Solid shot, case shot, and shells, are cast at iron works from white forge-iron. Formerly iron moulds were used for these, also ; but they had the effect of making the balls too hard on the surface, whereby the bore of the gun was injured. At present, therefore, projectiles are cast in sand, in mould-boxes.

The casting of solid balls is the most simple. The patterns for this purpose are of brass, very exactly turned, made in two halves, and fitting into each other by a groove. One half has a pin screwed into it, which forms the hole by which the metal is poured in at the casting. *Pl. 39, fig. 31*, shows the manner of moulding. The mould (flask) consists of the mould boxes (*fig. 29* shows two such boxes, standing one upon the other), which are secured together by key-bolts. In moulding, the grooved half of the pattern, *a*, in this case a 24-pound ball, is set upon the mould-board *s s*, and the tap-hole pin, *c*, screwed in ; then the mould-box is placed with its key-bolts in the holes made for them, and the half ball moulded by the sand layer *B* ; the mould is then turned over, the mould-board taken off, the second half-ball set on, the second mould-box placed, and the mould made in the same way ; then the mould is turned, the pin screwed out, the mould-box opened, and both patterns taken out, when it is again closed, and is then ready for casting. Smaller balls, as 6-pound and case-shot, are moulded four or more in one box. *Fig. 30* shows one part of a mould-box for four 6-pound balls, and *fig. 29* the two boxes, one on the other. *A* is the upper box, *B* the lower box ; *a a* are the patterns ; *b*, the jet hole, lying in the centre ; *d d*, the jet channels, which are cut in when the mould is finished ; *c c* are small pipes, air-vents, to let the air pass out when the mould is filled : *e e*, the key-bolts. The mould of the hollow shot is more complicated, because the internal cavity of these must be formed by a core, which remains in the mould during the casting and is removed afterwards ; and because, also, for the larger, a pair of ears must be cast in, for the shell-hooks to catch hold of in transportation. *Fig. 32* shows the two mould-boxes for a shell or bomb, with the patterns belonging to them as placed for moulding. *A* is the lower mould-box ; *g*, a plug, by means of which the fuse-hole is formed, and which is replaced afterwards by the core-spindle ; *a* is the pattern, upon which are a pair of ears, to form the sockets for those of the shell ; *B* is the upper mould-box ; *a*, the pattern, with the jet-hole *b*, and the air-vent *c*, for the escape of the gas which is generated. For hollow shot it is preferable to

have the metal run into the mould at the side, so that the core be not disturbed in its position by the metal falling perpendicularly upon it. *Fig. 33* shows the upper view of the lower mould-box: *a* is the pattern; *g*, the thumb-screw nut of the screw which holds the pattern of the fuse-hole plug, and which is loosened in withdrawing the patterns; *A* is the sand bed of the mould; *m*, hooks for lifting the mould-box. The core is formed either of sand or loam. *Pl. 39, fig. 34*, shows the perpendicular section of both mould-boxes, with the loam-core in place, for a shell or bomb; *fig. 36* is the side view of the two mould-boxes; *fig. 35*, the upper view of the finished mould; *fig. 37*, under view of the same: *A* is the upper, *B* the lower mould-box; *a* is the cavity which is to be filled with metal; *b*, the jet hole; *c* are key-bolts, to hold the mould-boxes; *e*, air-vents; *f*, key-bolts, to hold the core-spindle, *k*, immovable in the bridge *n*; *g*, ears set in the mould, for the shell-hooks; the holes for the ears are made by small clay cylinders inserted in the mould. The ears are of wrought iron, and the ends reach into the internal cavity, where they are afterwards imbedded in the metal. *k*, core-spindle of wood or sheet iron and covered with a thin coat of loam, bored diagonally through lengthwise, to permit the gas to escape from the core. The core, *i*, consists of spun hay, which is wound firmly upon the spindle, and covered with several coats of loam, then turned at the core bench according to the pattern, and well dried; *l*, bolt to secure the perfectly accurate placing of the halves of the mould; *m*, hooks for handling. The sand-cores, which are better and now more used than the loam cores, are struck in a mould with three parts. *Fig. 40* shows one of the two like parts *a*, which, united by the third, the cap *p* (*fig. 41*), are closed, and their internal cavity becomes exactly the size of the core; *o* is the handle for taking off the cap. *Fig. 38* is a view, *fig. 39* a section of a core-spindle: *h*, the shaft; *f*, the hole for the fixing-key; *k*, the holes bored for air-vents. To strike the sand-core, the stuff for which consists of a mixture of sand, loam, and powdered cinders or coke, the two parts *a* (*fig. 40*) are brought into a moulding-bench (*fig. 42*, upper view, *fig. 43*, longitudinal profile, *fig. 44*, half cross-section). Upon the mould box *r* the core-spindle *k* is made fast by the key *f*, the half-moulds, *a*, set on and pressed together by means of the cheeks *C C* and the screws *D D*, then a couple of wires, *e*, are laid in to form the air vents, and the core rammed solid with the mould-stuff; the cap *p*, set on by the handle *o*, and struck to make the foot of the core firm. When now the mould is opened the core can be taken out, dried, and set in the finished mould. For fire-bombs, which have three fire-holes, *a* (*fig. 45*, section, *fig. 46*, view of a fire-bomb), the sockets for the clay cylinders, which are to form the core of these holes, are formed at the same time with the mould. *Fig. 47* shows the two mould-boxes, *A* and *B*, for fire-bombs, with the pattern placed in them; *fig. 48*, the upper view of the lower mould-box *A*; *fig. 49*, the vertical sections of both mould-boxes, with the core in its place; *fig. 50*, the lower mould-box, with the section of the core; *a* is the pattern, having beneath the spindle *q*, by which the fuse-hole is formed; in the middle is the projection, *r*, by which the bed for the hollow clay cylinder, *s*, is formed, running a piece into the mould sand, and reaching to the core; *i* is

the core ; *c*, the jet hole ; *ee*, the key-bolts for locking the mould ; and *f*, key-bolt for the core-spindle.

3. *Military Pyrotechny.*

The manufacture of cartridges of all kinds, and of fireworks generally, especially of fire and light balls and rockets for military purposes, is the object of a particular art, that of Military Pyrotechny, the basis of which is, of course, the manufacture of gunpowder, since from this, in its various forms and with different additions, the above named articles are all produced.

a. GUNPOWDER. Gunpowder is a mixture of sulphur, saltpetre, and charcoal. The roll-sulphur is pulverized, and the saltpetre likewise. The charcoal, from soft but not gummy woods (linden, alder, poplar, &c.), is also powdered fine by a particular apparatus. The proportion of the ingredients is various ; a medium (Prussian military powder) is 75 parts saltpetre, 12½ sulphur, and 12½ charcoal. The materials are first mixed dry. This is done in a mixing barrel, *bb*, divided by partitions, *I* (*pl. 40, fig. 5*, cross-section, *fig. 6*, longitudinal section), which is turned by the crank *a*, and set on the inside with laths, *c* ; the trap *d* serves to fill and empty it. The material when well mixed is brought to the mill, which is either a rolling or stamping-mill. The latter is the most simple ; *fig. 1* gives a view, *fig. 2* the section of one. In a block, *D*, the pots or pits *G G G* are hollowed out, in which the lower surface is made of hard heart wood, and which are narrower above than below, so that the stuff continually falls back upon itself. In each of these run two stamps, *E E*, shod with bronze, which are lifted alternately by cams, *a*, on the cylinder *A*, lying on the frame *F*, which cylinder is set in motion by some power applied to the cog-wheels *B* and *C*. The rolling-mill (*fig. 3*, side view, *fig. 4*, upper view) has a marble bed-stone, *A*, on which rests the bed, *a*, for the vertical shaft *B*, of which *b* is the upper bed, and which is turned by the bevel-wheels *Q*, on the shaft *S*, working into the bevel-wheel *P*. This vertical shaft carries the runner-axle *D*, which by an arrangement at *d* can be set higher or lower, and on this revolves the marble runner, *E E*, which by means of the wedge arrangement *dd*, and the plates *t* and *x*, is pressed against the end, *m*, of the axle, and runs round with it. The standing shaft carries at the same time the two frames *F* and *G* for lifting and dropping the three crutches, *H, I, K*, which serve to bring the material constantly from the centre and edge under the path of the runner. The lever arrangement, *L*, whose point of support is at *c*, raises or lowers the supports *m* for *K*, *i* for *J*, and *p p* and *q* for *H*. *N* is the border (curb) of the bed-stone ; *M*, a trap for removing the finished material from the stone by means of the curved crutch, *H*. The well mingled mass is moistened with water, brought to one or the other of these mills, and then more intimately and perfectly mixed and worked together. Thus mixed it is taken to the plate-mill (*fig. 7*), where it is converted into cakes of one and a half to two lines in thickness. In the frame *A* lie the rollers *B* (turned by means of the cog-wheels *D* and *I*), *E*, and *F*, connected by an

endless band. For the roller B there is an endless band, G, which is stretched by the roller C. The powder mass, still in its half-moist state, is shaken through the hopper H, and pressed between the rollers B and E into cakes, which fall by fragments into the receiver K. These powder cakes are then grained. The graining-sieve (*fig. 9*) consists of as many sieves, set one within the other, with exactly pierced parchment floors, as there are kinds of powder to be produced. Here, B, C, and D are the sieves. The mass is placed in D, loaded with a leaden disk, E, and by the motion of the sieve the powder is formed according to the size of the holes. The dust falls through the finest sieve into the chest A, and is then worked anew. The very sharp-grained powders are good for military purposes, but for hunting the powder is glazed in the glazing-casks. These casks (*fig. 10 C*) are set one behind the other on a shaft in the frame F, and made to revolve, at first slowly then more rapidly, by the driving wheels A and B; inside they have laths, against which the grains strike and thus smoothe each other. If the powder is to be polished at the same time, lead balls are mingled with the mass. A particular process for making powder with perfectly round grains is that of Champy (*fig. 8*). Here the mass is brought dry to the barrel A, whose shaft, *a*, turns in the frame *g*; by the pipe *d* a jet of water is thrown upon the mass, through a very finely pierced rose; the grains form themselves, and by motion become, avalanche-like, perfectly spherical. The cock *c* shuts off the water, and the trap *e* gives access to the barrel. The powder, when finished, is dried in heated drying-rooms, and then proved. For proving, the vertical eprouvette is very commonly used (*pl. 40, fig. 11*); the proof-charge is placed in the small mortar *a*, and upon it the foot of the notched staff *b*, which is loaded at the top, *d*, and passes through the cross-piece, *f*, of the frame, *e e*. If the charge is now fired the staff *b* is driven up and retained at the greatest height it reaches by pawls on the cross-piece, which catch in the notches; the strength of the powder is judged by the relative height to which the staff is driven, a normal powder being taken as the standard. Another proof is that with the eprouvette mortar (*fig. 12*), from which three discharges are made with the standard powder, three with the powder to be proved, and the strength determined by the average effect of these discharges. The proved powder is placed, in barrels containing one cwt. each, in the powder magazine. The field magazines (*fig. 13*, ground plan, *fig. 14*, longitudinal section along A' B', *fig. 15*, cross section along C' D') in batteries, &c., are partly sunk in the earth at F; a sloping passage, G, leads down to this, and a small ditch, H, serves to collect all the moisture, with a view to which the floor of the magazine slightly slopes towards it. The magazine is closed in, all around, with filled gabions, E E; on the top of which is a layer of fascines, D; then comes a row of air-holes, C; and a plank cover, above which is another row of fascines, and then a layer of earth, A. The door is always turned away from the enemy. The permanent magazines (*fig. 16*, ground plan, *fig. 17*, cross section, *fig. 18*, ground plan on a larger scale, *fig. 19*, longitudinal section on the same) are massive bomb-proof structures, G, surrounded with rampart and ditch. G is the building, F the space with the rampart, A the

breastwork, E the banquette, B the exterior slope, C the ditch, D the glacis, and H' a bridge over the ditch. The internal space of the magazine is divided into the magazine proper, G, and the ante-room, H. In the walls of the magazine are air-holes, and *a*, *b*, and *c*, show the different forms of these, *a* and *b* being so arranged that no fire can penetrate through them. I are wooden frames, on to which the powder-barrels are rolled over woollen covers, and where they are laid upon covers of the same. In peace, a roof-frame, L, rests upon the magazine; in war, this is filled with earth.

b. MUSKET AND CANNON CARTRIDGES. For service-firing, powder is made up into cartridges, either musket or cannon. These cartridges contain usually, along with the powder, the ball also; for chambered guns alone is the charge separate, and these are often loaded with the ladle or the measure.

Musket cartridges consist of a piece of paper (*pl.* 40, *fig.* 20), one side of which, that it may wind more closely, is cut obliquely; this leaf, *a*, is rolled about a former, *b* (*fig.* 21), the ball *d* set in, and the throat *c* choked with a tie of linen thread, and struck down upon the ball. Then the cartridge is filled and pinched together at the top (*fig.* 22). For cannon cartridges, bags are made of flannel or parchment; at present, flannel is used almost entirely. For marking out the form upon the piece of stuff, the pattern board *a a'* (*fig.* 23) is used, and a second, which reaches only to the line *b b'*, for the seam: there are also half-pattern boards, when the stuff is laid double. Each calibre has its own pattern board. The length of the cartridge depends upon its being designed to hold the ball or not. When the bag is sewed with the back-stitch, turned, and felled, the sabot *a* (*fig.* 24), which has a groove, *b*, is set in, the ball *c* is placed in the sabot, and then the head *g* tied, after which the tie *h* is made in the groove *g* with a firework knot; *e* is the charge of powder. Often the ball, *c* (*fig.* 25), is fastened to the sabot, *a*, by two strips of tin, crossing each other at right angles; then the bag is made shorter, and fastened, at *h*, with a firework knot to the sabot groove. The first cartridges are best. Grape shot can be shaken in over a sabot in a longer bag, the bag tied to a head above and the ball space netted with twine; they are usually, however, put into tin boxes (*fig.* 27, section, *fig.* 28, view). Over the charge, *a*, comes a sabot, *b*, with the groove *c*, and on this sabot the case *d* (black for large balls, red for small) is nailed, which has first the iron culot *e*, then the ball *f*, and finally a bottom, *g*, over which the tin case is bent; at *c* the case is united to the bag by a firework knot.

c. FIRE AND LIGHT BALLS. Fire-balls are used to set buildings, &c., on fire, and light-balls to discover the movements and workmen of the enemy at night. Both are made in the same manner, only the filling is different. There belong to them an iron skeleton, the carcass (*fig.* 29), which is covered with a canvas bag, filled warm and formed, a fuse driven into the upper orifice, the sack tied fast to the same, and the slack turned back into the carcass (*fig.* 30). The fire-ball composition consists of thirty parts coarse powder, ten pitch, ten rosin, five colophon, two tallow, and one part tow. The light ball composition is of one part meal powder, ten parts salt-petre, four and a half sulphur, and one part antimony.

d. SIGNAL ROCKETS. To communicate signals at great distances rockets are employed, which are made of various dimensions. The largest of these, having the calibre of a one-pound iron ball, mount to the height of 5,500 ft. The rocket composition consists of a mixture of meal powder and charcoal, which is rammed in such a manner into a case made up of paper rolled together and pasted, that a central cavity is left through the whole length. To make the rocket case, sheets of paper (a one-pound rocket requires about sixteen sheets of writing-paper) are rolled upon an exactly calibred wooden staff, the "former;" then, at a short distance from the end, broken in and choked (*pl. 40, fig. 8, at h*), so that there still remains an opening into the case, the fuse-hole, and then tied. To fill this case with composition a rocket-mould is used (*fig. 31, section*); this consists of a foot, *a*, with the neck *a'*, upon which is the knob and spindle *d*, by which the bore of the rocket is formed. The mould proper, *b b*, is fastened to the neck by means of the pin *e*. In this mould the case is placed, and driven by means of the former *a* (*fig. 32, section*) upon the spindle, so that the hollow *b*, of the former, *cc*, receives the spindle, whereupon a light blow is given with the mallet (*fig. 37*), forcing the case down upon the knob, and forming the vault (*C, fig. 41*). Then some composition is poured in, and rammed firm with the rammer *a* (*fig. 33*), the hollow of which, *b*, receives the spindle. As the case fills higher and higher, rammers are used with a shorter cavity (*figs. 34 and 35*) and lastly the solid rammer (*fig. 36*), with which a short part, the solid portion, is driven. When the rocket is so far completed, it is taken from the mould (*fig. 38, a, rocket; h, choke; b, solid part*), and at *f* a somewhat larger chamber, *i*, placed upon it, in which some grain powder (the bursting charge) and a light-ball, are put, and the whole then terminated by the pointed cap, *g*. Such a rocket is now fastened to the stick *k* (*fig. 39*), by the ties *h* and *h'*, that it may mount in a straight line. This stick is seven times the length of the case, with which it must, when balanced a few inches from the mouth, be in equilibrium; *a* is the rocket, *i* the pot, *g* the cap. In the vault is placed the priming for lighting the charge, and the rocket, with the mouth free, is then hung upon a nail. If the rocket is not to throw a fire-ball, but only to make a report, then a petard is placed in the pot. This is made strongly of tin plate, and filled with powder. If the light signal is to fall slowly, it is furnished with a parachute (*fig. 40*). In the pot is then placed a tin light box, *a*, bored with holes, and provided with the four small wires, *c c c c*, to which the parachute is fastened, all this being placed in the pointed cap, and unfolded by the explosion.

e. CONGREVE ROCKETS. Great attention has been attracted, for a long time, to the rockets invented by the English Colonel Congreve, with which powerful effects were attained, although they have, perhaps, been somewhat exaggerated. For a length of time they were kept secret, but are now introduced into almost all artillery. The composition consists of saltpetre, sulphur, and meal powder, in various proportions, according to the size of the rocket. The largest have 20 parts saltpetre to 1 part sulphur and 1 meal powder. Many other substances, such as chlorate, &c., formerly added, are now laid aside, having been found to produce but insignificant

effects and greatly to increase the danger of preparation. The most that is done is to moisten the composition with oil of turpentine. The case of the Congreve rocket is made of sheet iron, and in the pot incendiary composition is placed; the cap is made very strong, as the rocket is to serve as a projectile at the same time. *Pl. 40, fig. 41*, shows a Congreve rocket, and it will be perceived that externally it differs but little from the signal rocket; it is, however, much larger, from two to three inches in diameter. A, the rocket; B, composition; C, vault; D, incendiary composition with bursting-charge; E, cap; FF, choke-tie; G, stick. *Fig. 42* is a Congreve rocket, as made at Vincennes, after Bem's method. BB is the rocket proper, of sheet iron, with the composition; BE, the choke-tie for the stick, F; C is the pot, filled with incendiary composition and pierced with holes; D, a barbed head on the cap, to hold the rocket fast when it strikes. *Fig. 43* is a rocket after Congreve's last pattern. This is put upon the stick, C, by means of a wrought-iron shoe, B, which carries the priming-vault, A (*fig. 45* shows this part in section, *fig. 44*, the lower view, where the six holes are seen, through which the blaze of the composition streams out). D is the rocket proper and E the pot, with the incendiary composition and the flame holes running out into a sharp conical head. *Fig. 46* shows the shoe, B, with the screw for the priming-vault, A. The French Colonel Brulard constructed the rocket now used in the French artillery, shown in *fig. 47*, which represents the case. AB, BC, CD are three compositions of various strength; then follows a layer of clay, *d b a*, through which a fuse, *f*, goes into the pot of the rocket; at *a a* the case is closed with strong iron plate. *Fig. 49* shows the outer view of the case; *fig. 48*, the pot, having a bursting-charge in the centre, which, kindled by the fuse *f* (*fig. 47*), bursts the pot and hurls around its loading of hand-grenades and musket-balls. To make sure that the bursting-charge is set off, even if the rocket is by any accident extinguished, and that it is lighted at the moment when the rocket reaches its destination, the plan of setting it off by percussion has been devised (*fig. 50*). In the iron case of the rocket, *d*, which has underneath, in the bottom *c c*, several flame holes, *e e*, an iron plate, *i k*, is fixed at top, at *a b*, and over the plate a cylindrical pot, containing a hand-grenade and bursting-charge, is securely screwed. The pot itself has three flame-holes in the part towards A. A is a box of cast iron, which is fastened to the rocket-case and loaded with a bursting-charge and incendiary composition. At *h* is a firing-rod, of iron, which stands upon a ball, *n*, of fulminating mercury. The instant the rocket strikes any object, the rod *h* is driven down upon the ball, causing it to explode, thus firing the whole charge of the pot and producing the effect. *Fig. 51* is the floor of the rocket with the flame-holes. *Fig. 52* is a Congreve rocket which is fired without stick, the screw-thread wound around it on the outside being designed to give it a regular motion of revolution and thus direct its flight. *Fig. 53* is a Congreve rocket which scatters hand-grenades in its flight. R is the rocket proper, whose floor at TT has flame-holes, and whose filling is at Z. U is part of a case which is screwed on, serving instead of a stick, and in the iron envelope of which small hand-grenades, V, are inserted, with a bursting-

charge. At the instant when the rocket is lighted the stick, U, is kindled also, and the hand-grenades are thrown out, one after another, as it flies.

To give the rockets a specific direction various apparatus are employed ; *fig. 54* shows one variety. Here is a tube, to which, as soon as the rocket is placed in it, the base cylinder, R X T V, is screwed fast, whose floor has a round orifice, U, for the stick of the rocket ; *ee* are four cuts in the circumference of the cylinder, and above these is a ring-formed groove. When the rocket is placed in the tube, the ring *lmvr* is slipped over the stick *o* (*fig. 55* gives a view of this ring with the flanges *l, m, n, p*), its flanges shoved through the cuts *ee* and then turned, so as to catch in the groove, whereby the tube is closed below ; *rv* are small pipes for the priming. *Fig. 56* is a rocket wagon : upon the under-frame, A, lies a bed, B, upon which stands the chest, C, in which are kept the rockets without stick. The sticks are fastened upon the bed and only attached to the rockets as wanted for use. E is the principal trestle, with the socket G, for the rocket H, for which a graduated curve, F, gives the elevation. The stick J rests upon the second upright D, in which a slide, K, is movable for the support of the stick. *Fig. 57* is the upper part of Congreve's rocket-wagon : upon the beam D slides, by means of the roller G, the bed A, on which, at B, is a hinge-joint, receiving the tube E H, which is fastened at F, and can be set higher or lower by means of the movable brace, C ; in this tube the rocket stick is inserted.

E. SCIENCE OF FORTIFICATION.

The Science of Fortification teaches so to prepare any point of ground by artificial means that upon it a small number of persons can maintain themselves against the attacks of a superior force. The point in question may be fortified only for a short time, or it may be desired to prepare it, in time of peace even, to sustain a regular siege ; and according to these different objects fortification is divided into temporary or field fortification, and fixed or permanent fortification. The art of fortification has been practised ever since the weak have had to defend themselves against the strong, and we may divide it, for our consideration, into three periods.

ANTIQUITY.

The first attempts to build stone walls were rude ; the stones were piled one upon another, just as they were found, and the interstices of the larger filled up with smaller ones. Soon they progressed so far as at least to hew the front of the stone and give the wall an even exterior. Gates and openings in such walls were at first very simply made, and *pl. 42, fig. 2*, gives a picture not only of the oldest Cyclopean wall of Tiryns, but shows also how the gate openings were covered only with one larger stone. These open-

ings must, of course, be very narrow, for the arch had not then been invented, and the ways which were devised to widen these passages are shown in the gates at *figs. 3* and *4*, which, although they approach the shape of the arch, have yet nothing of its peculiar principle of support.

In process of time the stones came to be hewed rectangularly, and thus the wall not only attained a more pleasing appearance, but gained very much in strength and solidity. *Fig. 1* shows the first beginning of such walls and the advance made in the gate openings. The most ancient example of bound masonry which has come down to us is in the walls of the city of Mycenæ, founded by Perseus (now the hamlet Charvati). These walls were, like those of Tiryns, from twenty to twenty-four feet thick (*fig. 5*). In these walls is found also the Gate of the Lions, with the oldest example of stone-carving, brought to light in 1842; it is represented in our view. The gate is five paces wide, and the large slabs of the floor show wheel-marks; above it is narrower, and behind it, as well as in several places in the wall, passages are found, covered with blocks of stone leaning gable-wise against each other. Upon the wall are traces of battlements.

Very soon it was perceived that a long line of wall offered an inefficient defence, and towers were added to this wall, which projected forwards from it, and thus enabled its defenders to get at the enemy at its foot. The walls of Mycenæ, indeed, show a tower of this kind, but the arrangement is seen in greater perfection in the walls of the city of Messene, founded by Epaminondas, 349 years before Christ. *Pl. 42, fig. 6*, shows a portion of the city wall with such a tower; *fig. 9* gives the ground plan of the same, and it is seen that the walls were only faced with hewn stone and filled up within with rubbish. This construction is shown still more plainly in the horizontal section through the window of the tower (*fig. 7*). Semicircular towers, also, supposed to be of this same period, are found; *fig. 8* gives the ground plan of such a one, said to have been discovered at Sipylos. *Fig. 12* gives the ground plan of a portion of the walls of Babylon, showing a peculiar construction of the hewn stone facing with loop holes, and *fig. 13* is the elevation of a gate with its defensive towers. In all these constructions the straight line alone prevails, while the walls of Assos in the ancient Troas (now Bairam) present already traces of arch. *Fig. 14* shows the ground plan for part of these walls, with indications of their peculiar construction, and exhibits also the manner in which the defence of the gate was especially provided for, it being placed back between two towers, and thus the approach to it narrowed. *Fig. 15* gives the elevation of the gate with its two towers.

An already much improved construction is displayed in the walls which connected the Acropolis of Athens with the harbor of the Piræus. These walls (*pl. 43, fig. 1*, elevation, *fig. 2*, ground plan, *fig. 5*, section of a tower, *fig. 3*, ground-plan of the upper story of a tower, *fig. 4*, vertical section through the wall) were laid out in straight lines, and received their flank defence by means of the towers which were carried up above the wall. The upper surface of the wall, 25 feet in breadth, had on the outside

machicolated battlements, and on the inside a raised breastwork; the towers had several stories, divided from each other by layers of beams and connected by steps. The towers were so arranged also as to afford the only access to the top of the wall.

The walls of the ancient Falerii, in Etruria, which so long resisted the Romans, and was first subjected 241 years before Christ, present the earliest example of the true arch construction in the gates (*pl. 42, fig. 16*), which were flanked by two square towers. The key-stone of the arch is ornamented with a man's head. The wall itself is so entirely destroyed that of the construction of the battlements, &c., not a trace remains.

Far more perfect is the construction of the arch shown in the three entrances of the Porta Veneris of Spello, in Umbria. This gate, of which *fig. 10* is the plan and *fig. 11* the elevation, displays besides more architectural decoration.

Of great interest are the walls of Pompeii, as affording already an example of a double and even a triple defence. *Pl. 43, fig. 10*, gives a perspective view of part of these walls, as restored, for upon the excavation of this city, which, as is well known, was buried during an eruption of Vesuvius, 79 B. C., by a shower of ashes, they appeared as shown in *fig. 13*. *Fig. 11* is a horizontal section of the whole structure just above the surface of the earth; *fig. 12*, a similar section through the upper story of a tower; *fig. 14*, a vertical section through the wall; *fig. 15*, the same through a flanking tower. The lower part of these walls belongs to the most ancient constructions of this kind, and here for the first time water conduits appear; these, however, as well as the second row of machicoles above, and the terrace arrangements upon the towers, belong to a later period, that of the wars between Cæsar and Pompey. *Pl. 42, fig. 18*, is a view of the gate of Pompeii which lies in the direction of the ancient Nola, whence it took its name. This gate, which is restored in our representation, was found completely destroyed in its upper part; the arch construction, however, was unmistakable.

The walls of ancient Rome, dating from the age of Aurelian, form still a part of the environment of Rome, and are remarkable for being built of brick, whereas all the structures hitherto mentioned have been of stone. *Pl. 43, fig. 6*, gives a view of the Capitoline hill with its defences at the time of ancient Rome. Here also curtains of wall, straight on the outer side, alternate with towers (*fig. 7*); on the inside, however, the construction is different. *Fig. 8* gives a perspective view of the inside of the wall, and *fig. 9* the horizontal cross-section, about seven feet from the earth. From the views here given, and from the vertical section through the wall (*pl. 42, fig. 19*), it is seen that the rear part of the same formed what was called a *cavata*, a vaulted passage, open on one side, which was raised above the footway, and to which access was found through the towers, while above this covered gallery the wall appears terrace-formed. The towers, of which *pl. 42, fig. 20*, shows the vertical section, overtopped the walls considerably, and preserved by means of loop-holes, a defence in line with the battlements upon these, while they had a

second higher up on their terraces. *Fig. 17* is a representation of the Appian Gate, which is remarkable as having certainly formed part of the most ancient fortification, since the lower portions of the tower and the wall are constructed of hewn stone. The superstructure, with the machicolis, is of brick, and was built in the age of Aurelian ; while the two towers, semicircular in front, but square within and behind, date unquestionably from the earlier middle ages.

As to the temporary fortification of the ancients, their field intrenchments, it was very simple, owing to the mode of their warfare. Their field fortification was confined mostly to the intrenchment of their camps, and we have seen already that this intrenchment consisted merely of a breastwork thrown up of earth, and secured with an abattis. In a camp, however, which was to be occupied for some time, a permanent camp as it was called, the intrenchment was made more enduring, and so arranged that the encamped force could resist a violent assault, or even sustain a short siege. The fortifications of such a camp (*pl. 41, fig. 1*) had then much similarity to those of a city, consisting also of long walls broken at intervals by flanking towers. The walls, with their battlements, were low, however, and rested upon a mound of earth. At the junction of the mound and the wall, to render the scaling of the last more difficult, was set a palisade of sharp stakes connected by cross beams, and a similar palisade was placed at the foot, so that the assailants, before they could approach to scale the wall, were exposed for some time to the missiles of the defenders. At the distance of 100 paces from the rampart, another smaller breastwork was carried around the camp ; the space between the two was thickly set with caltrops (*pl. 51, fig. 54*). The towers were of the same height as the rampart, and were used as stations for the projectile engines ; wherefore the terreplein, which ran in rear of the rampart, was made wider behind them. The winter camps were more solidly constructed, and formed as it were little cities. They were designed mostly for protecting the frontiers, and were provided with lofty stone watch-towers, which served at the same time for magazines and as dwellings for the guard cohorts (*pl. 35, fig. 1*). These watch-towers were no further distant from each other than the range of distinct vision, and were protected by rows of palisades and abattis. Signals were given from them at night by torches and fire, and during the day by smoke, the meaning of the signals being agreed upon beforehand.

THE MIDDLE AGES.

Fortification in the Middle Ages varied in general very little from that of antiquity. The predominant activity of the higher and feudal nobility, while the burgher class in the cities were even more and more estranged from the profession of arms, caused the cities to remain open, or protected at least only by a simple wall, while fortification proper was confined to the castles of the knights and the citadels erected for the defence of the cities.

The military engineers of the middle ages, like our own, were required to solve the problem, so to arrange their works that they should mutually defend each other; whence it followed that the interior works must command the exterior. Accordingly the fortifications of the middle ages consisted usually of a ditch surrounding the whole place, of a closed circumscribing wall, and a place of retreat, in which the garrison could defend themselves even when the wall was in possession of the enemy. In the cities, whenever these were walled, there was a citadel for this purpose; in the castles, a tower, which was stronger than the rest, and independent of the other parts of the fortification.

In the fortification of the middle ages, which we must study in burghs and castles, the following objects are to be considered:

a. DITCHES. The most ancient ditches were simple excavations without revetment, at least on the outer side (*pl. 44, fig. 1^a*), for on the inner the vertically rising wall made the wall of the ditch. The outer side of the ditch, the counterscarp, took the natural slope of the earth, and not until later was this also made steep and revetted with masonry. Wherever it was possible, the ditches were filled with water, but frequently there was in the middle of the floor of the main ditch a narrower ditch, the *cunette*, which alone was filled with water, while the rest of the ditch was dry (*fig. 1^b*). The dry ditches were always thickly set with caltrops (*pl. 51, fig. 54*).

b. BRIDGES. The passage over the ditch was by bridges, or rarely by dikes crossing it. The most ancient bridges were simple; very soon, however, wide drawbridges were constructed, in which one part was fixed and one movable, so that it could be hoisted up. *Pl. 44, fig. 12*, shows the drawbridge of St. John's gate at Provins, from without; *fig. 13*, from within. The draw part was attached by chains to two long beams, which reached back inside of the gate, were pulled down at that end, and thus raised up at the other, carrying the draw with them. If the draw was very light, for foot passengers alone, it was constructed as in *fig. 11*. If, on the contrary, the river was very broad, and the bridge of stone, there were usually one or more towers in the centre to afford a multifold and enduring defence. *Pl. 46, fig. 1*, shows a bridge thus secured at Sutri in Italy.

c. OUTWORKS. To cover the bridge, a small fortification was erected on the opposite bank, frequently only a breastwork with palisades, sometimes, especially when a remote point of importance was to be secured, a separate tower, which was connected with the main work by a subterranean or other covered passage. *Pl. 44, fig. 14*, shows the ground plan of such a fortification (bridge-head) lying opposite the bridge of Vincennes; *fig. 15* gives the elevation also. *Pl. 46, fig. 11*, is the ground plan of the old Louvre, where at F, such a bridge-head and detached work may be seen.

d. GATES. The gates of old fortifications are almost always placed in a very thick walls and flanked by two towers, so that the entrance could be more readily defended. Often the gate is double, and between the two there will be found a court inclosed by walls. The old gate of San Vincente in Spain (*fig. 2*) shows such a court, and the gallery which con-

nects the towers is likewise devoted to defence. The round building (*fig. 3*), which represents the gate at Brussels (towards Namur), has also an inner court for defence. In most cases there will be found, besides the main gate, a small gate for foot passengers (*pl. 44, figs. 12 and 13*). Between the two main gates there was yet another means of defence, namely, a grating of strong iron bars or oak beams (portcullis, *pl. 46, fig. 4*, view; *fig. 5*, plan), which was usually kept hoisted (by means of a windlass), and dropped only at the moment of need. This grate, B, lay between the two gateways, A and B, in a groove in the wall of the two gate towers, DD. Then double portcullises were found, as the groove in the section *fig. 7* shows. *Fig. 6* shows the inner view of this gate, with the wicket which led upon the tower and to the machinery of the portcullis.

e. TOWERS. The long lines of fortification were flanked by towers, and important points of the works were also strengthened by such towers; they were of various forms, sometimes rectangular and vertical, as the towers of Narbonne, with small watch-towers at the corners (*pl. 45, fig. 3*), round, oval, conical, pyramidal, triangular, with the corners cut off, and battlements like the tower of Beaucaire (*fig. 2*); this last when they were at very salient angles. Frequently they were strengthened by buttresses running from bottom to top, as in the tower of Vez (*fig. 4*).

f. BATTLEMENTS, TURRETS. The crest of the wall was set with a kind of stone shield, the battlements, behind which the defenders found shelter from the hostile missiles, and which were in use as early as the time of Homer. The battlements received the greatest variety of forms, and were always wider than the intervals between them. They were either square above (*fig. 6*), or pointed, or round (*fig. 7*), or crenellated (*fig. 9*), or pyramidal (*fig. 8*), or furnished with a little sloping roof, as in the Palace of Justice at Paris (*fig. 10*).

g. MACHICOULIS. Windows and turrets were furnished also with certain defences to gall the foe at the foot of the wall. For this purpose there lay above the windows and gates small projections (machicoulis), with openings in their floors (*pl. 44, fig. 10*, of the Hôtel de Sens at Paris), through which stones, melted lead, hot pitch, or the like, could be dropped upon the assailants. The advantage of such contrivances was very soon perceived, and the whole wall was provided with similar openings. The crest of the wall in the old Bastille displays this arrangement; *pl. 45, fig. 12, B*, are the battlements: A, is one of those openings, which, as is seen, went from the crest of the wall through the cornice; in time of peace they were closed with grates. *Fig. 13* shows the whole arrangement more clearly in section: A is the wall; C, the battlement; and B, the moucharaby or machicoulis, which goes through the cornice, D. The walls of Avignon (*fig. 14*) and of the castle of Mehun (*fig. 11*), &c., had similar arrangements.

h. PLATFORMS. The towers had, above the battlements, either conical or pyramidal roofs, or they were covered at top with a flat platform. For the protection of the watchmen stationed upon them, there were little turrets at the corners (*pl. 44, fig. 4*); and to shelter the steps from the rain a tower was erected over the stairway, the lantern (*fig. 7*).

i. **WINDOWS, LOOPHOLES.** The windows and loopholes in the old walls and towers are generally very narrow, and the first lay so high (*pl.* 44, *fig.* 8) that they could not easily be scaled. The loopholes are very narrow at the outer side, and grow wider inwards. Their forms are various. *Pl.* 46, *figs.* 12–19, give the most common, some of which are also shown on *pl.* 45, *figs.* 6 and 14. The loopholes were so constructed, moreover, that even the balls or bolts which struck in them could not penetrate into the interior of the room or tower. *Pl.* 46, *figs.* 20 and 21, show the section of such loopholes: AB, is the opening of the loophole in the wall; CA is a small vault, against which the ball or bolt coming from below, as from D, for example, must strike and rebound, instead of passing into the interior.

k. **FORTRESS TOWERS, DONJONS.** The interior of a burgh or fortress was usually, as has already been mentioned, protected by a particular work, the redoubt. The fortress-towers, donjons as they were called, either formed part of the enceinte itself or lay entirely isolated, as in the former castle of Vincennes (*pl.* 44, *fig.* 14, plan; *fig.* 15, perspective view). Where these towers are extensive enough, they have also a redoubt in and for themselves. The walls of these donjons are of extraordinary thickness, and, not to diminish the interior space, the stairs are usually either in a tower by themselves, or wholly or in part in the thickness of the wall of the main tower. The tower of Montlhéry (*fig.* 5, ground plan, *fig.* 6, view of the stairs) affords a good illustration of this. A is the interior hexagonal space of the very thick tower. The stairs are carried up, at first, in a separate tower B, and pass from that, by means of a strait gallery in the staircase, into the wall of the tower. The walls have loopholes, which light at the same time the interior of the tower and the staircase. In order to bring large objects on to the tower, there were trap-doors in every story. The ground-floors served as magazines, and could be reached only from the interior of the tower. The windows of the various stories were not one over the other, and, from the great thickness of the walls, the recesses of these windows made little rooms by themselves, which had stone seats (*fig.* 8). Sometimes very peculiar constructions are found in these donjons. An instance of this is the tower of Clansayes, in the Department of Drôme, which has a different shape in every story (*fig.* 2). The ground-floor, designated by A in our plan, forms a square with a pilaster buttress on each side. The loopholes present a more complicated than effective system. The middle story, of which B is the plan, forms a regular octagon, resting upon arches turned in the wall. The third story, finally, is a perfect square with rounded angles.

l. **SUBTERRANEAN SPACE.** Most castles, and particularly the donjons, had a greater or less extent of subterranean space, which was devoted to various uses. It was occupied generally for prisons or magazines; sometimes there were long galleries running underneath the ditches and having an exit far out in the open field, which were designed to afford means of communication for the garrison with the world outside, when the fortress was beleaguered. *Pl.* 44, *fig.* 9, represents a magazine under the donjon

of Viviers. A particular species of dungeons were the so called oubliettes, into which prisoners condemned to die of hunger were thrown. One of the best preserved specimens of these is afforded by the tower of Chinon (*fig. 3*, in section). The door A leads immediately into the oubliette; about ten feet above the door are traces of beams, on which, doubtless, was a floor with a trap. The object of the oblique piece CC is not easy to discover.

m. FORTRESSES. We shall give here, by a few examples, all the different parts of a fortress or castle-fort in connexion, and for this purpose we select the Old Louvre at Paris, of which *pl. 46, fig. 11*, represents the ground plan. A is a round tower, the donjon standing isolated in the middle of the court. B are drawbridges, leading over the ditches in front of the three gates. C are defensive towers, of which the four at the corners project considerably beyond the face of the wall, that they may better flank the straight lines (curtains). D are the dwellings, which lie in the curtains. E is the castle chapel, and F detached works beyond the ditch. The now destroyed Bastille in Paris, of which *fig. 9* is the ground plan, *fig. 8*, a view, and *fig. 10*, a section, formed nearly a parallelogram, which was defended by eight towers, A, cylindrical upon conical foundations, flanking the curtains, B, whose battlements and other defensive arrangements we have already mentioned. Over the ditch H leads the drawbridge G to the only entrance of the fortress. The two courts C and D were separated by the middle building, E, which contained the dwelling of the commandant and the barracks. F were guard-rooms, &c., for the garrison. The towers, vaulted within, were divided into stories, the floors of which were double, to prevent all communication between the stories. Under some of the towers oubliettes were placed. *Pl. 44, fig. 16*, gives a view of the Castle of Rheinstein, belonging to the Prince of Prussia, restored in the spirit of the middle ages.

A remarkable defensive fortification is the Wall of China, represented in *pl. 45, fig. 1*, which is, according to some authorities, 600, according to others, 1200 miles in length, 20 feet high, 25 feet thick at bottom and 10 at top, and erected between China proper and Mongolia and Tungusia as a security against hostile inroads. It passes over mountains, valleys, and rivers, and at regular intervals a tower is erected. Later travellers state that its dimensions as given above are much exaggerated; that though in some portions well built, in many parts it was little better than a low mud wall, and that it is now in a very dilapidated condition. This wall was commenced 247 to 210 years before Christ by the Emperor Tsching-Whang, and consisted at first of detached portions, which were united into a whole not earlier than the fifteenth century.

MODERN TIMES.

The art of fortification has in modern times made very great advances, the works especially of Erard Bar le Duc, Sturm, Rimpler, above all the improvements of Vauban, Cohorn, and later, of Carnot, Virgin, Cormon-

taigne, and Montalembert, have brought this branch of military science to a very high degree of perfection

1. *Field Fortification.*

The object of every fortification is so to surround a spot with obstacles, that a division of troops occupying the same may defend themselves with advantage against superior numbers. If only the passing movements of an army are to be thus supported, the fortifications are but simple. A fundamental principle is, that every point of the work shall be swept by two fires, a direct and a cross or flanking fire, taking the enemy on the side; the distance, therefore, from one flanking point to another must never exceed good musket range, that is, from 300 to 480 feet.

Field works are divided into three classes: open works, closed works, and fortified lines.

a. OPEN WORKS. All works not entirely inclosed by their parapet are said to be open. They are, according to their form, 1, simple redans or tenailles, which consist of the straight lines of fire (faces) meeting each other under a greater or less angle, sometimes broken and furnished with flanks. If it is desired to protect the salient by a cross-fire, the flanks are broken to the front (*pl. 47, fig. 5*). The redan *b a b* has the flanks *c d*, which defend the dead-angle in front of the salient *a* by a cross-fire. The flanks must never be more than half musket-shot distance from the salient angle, and must stand perpendicularly to the face on which they belong. If the ground is too extended for a simple redan, it is then doubled (*pl. 47, fig. 6, g a b a g*), and here also the flanks *b d c* can be broken to the front. Such double redans are called swallow-tails, and double swallow-tails when there are three salient and two re-entering angles (*fig. 7*), in which case the flanks are still broken forward. The salient angles must not be less than 60° , the re-entering not less than 90° . If the extent of the space to be defended or other local circumstances render it requisite, a system of tenailles is employed (*fig. 9*); the side of the polygon must not, however, exceed 180 feet. When a longer polygon side than this is to be defended, *a a* (*fig. 10*), it is broken repeatedly and a bastion constructed upon it. For this purpose the triangle *a a a* is constructed, from the two new and the old polygon sides, and in the centre *c* of the new polygon side the perpendicular *c b* is erected, which for the square is $\frac{1}{2}$, for the pentagon $\frac{1}{5}$, and for the hexagon, &c., $\frac{1}{6}$ of the side in length. Through all the points *a* and *b*, undetermined lines, *a x*, are drawn, and *a d* made equal to $\frac{2}{3} a a$, by which the faces of the bastion are given. From *d* perpendiculars are let fall upon *a x*, thus obtaining the flanks of the bastion, and if now the extremities of the opposite flanks are united by straight lines, the curtains, we have the complete trace of the bastioned front.

b. INCLOSED WORKS. If the point to be defended is exposed to attack on all sides, the defences must then surround it, thus forming an inclosed work. The dimensions of such works, and consequently the length of their polygon sides, depend upon the strength of the assigned garrison, and

whether they are to be provided with artillery. Inclosed works are either those whose polygon sides are straight sides, redoubts, or flanked works, whose polygon sides are therefore broken field-forts. Redoubts may be triangular, square, or polygonal, but with the number of sides increases also the number of dead-angles (which cannot be defended), and therefore redoubts with more than four sides are unserviceable. The side of a redoubt which is to be defended only by infantry, must not inclose more than 96 feet, and then a garrison of 360 to 390 men is required. If defended by artillery, from 12 to 18 feet are reckoned along the crest for every piece. In estimating the interior space of a redoubt, nine square feet are reckoned for each man, and for each gun 360 square feet. Redoubts are never constructed with sides of less than 42 feet.

Field forts may be regular or irregular. The regular are : star forts, and forts with half or with whole bastions. Star forts are redoubts having their side once broken, so that they have only salient and re-entering angles and no flanks ; they have usually from 8 to 12 points. A star fort, if it have not more than twelve sides, is laid out by drawing a polygon of the given number of sides, in such a manner that these sides, bb (*fig. 36*), are of the length which is to be given to the faces of the work. Then upon each polygon side construct an equilateral triangle, baa , and the line of fire is completed. If, however, the position of the ground determines the salient angles of the star fort, then in the centre of the sides of the polygon uniting the vertices of the salient angles, perpendiculars are erected, which are made $\frac{1}{6}$ the length of their sides, and upon the points thus obtained the faces are drawn.

Forts with half bastions are laid out as follows : If a triangle is to be defended with half bastions (*pl. 47, fig. 11*), draw a triangle, fff , whose sides have collectively $\frac{3}{4}$ the length of the total line of fire (on which the defenders stand), prolong the sides, fff , of this triangle towards a , so that $fa = \frac{1}{3}ff$. Lay off from f to e , a distance equal to $\frac{1}{3}ff$, and erect, at e , a perpendicular, which intersects the line af at d , and completes the half bastion, ad being the face, de the flank, and ea the curtain. If a square is to be half bastioned (*fig. 12*), erect in the middle, c , of the polygon side, aa , the perpendicular, $cb = \frac{1}{8}aa$, draw the lines bca , lay off, upon these lines of defence, the parts $ad = \frac{2}{3}aa$, and let fall from d the perpendiculars, de , upon the corresponding lines of defence ; gh , are the lines of direction of the defenders' fire. The polygon side of a square with half bastion may be 240 to 600 feet, and the polygon is the stronger the more sides it has.

Forts with whole bastions belong rather to permanent fortifications. To construct them, erect in the centre, c , of the polygon side, aa (*fig. 13*), a perpendicular, cb , which for the square must be $\frac{1}{8}$, for the pentagon $\frac{1}{7}$, and for the hexagon, &c., $\frac{1}{6}$, of the length of the polygon side. Then draw from a , through the points b , the lines abx , make $ad = \frac{2}{3}aa$, and let fall from d , the perpendiculars de , upon the corresponding lines of defence, when ee are the curtains, de the flanks, and da the faces of the work. The curtain, which in the front, A , is straight, may be broken outwards as in the front, C , once, or twice as in the front, B , where $ff = \frac{1}{3}ee$. By

the last construction an effective fire is obtained in front of the faces from the line ef .

c. FORTIFIED LINES. When the ground to be defended has a great extent in one direction this long line must be intrenched. This may be done by lines without or by lines with flanks, forming salient and re-entering angles. Merely straight or curved lines not flanked present a very poor defence, wherefore they are broken, like the teeth of a saw (*en cremaillière*), by which they are flanked towards one side. Let it be the line N (*pl. 47, fig. 1*) which is to be defended; it is first divided into lengths of 360 or 140 feet, according as a single defence, as at A , or a double one, as at B , is desired. Then at d , perpendiculars are erected, $da = 48$ feet, and the lines ba drawn, upon which, at a , the perpendiculars, ba , are erected as flanks. *Cremaillières* have, however, many disadvantages, and it is preferable, therefore, to break the long lines by simple redans (*fig. 2^b*). The lengths, dd , amount to 720 feet, the perpendiculars, da , are 130 feet, and the half gorge of the redan, db , is 90 feet. Here, however, the defence is good only before Y , and in front of a lies a dead angle. It is better, therefore, to make dd only 480 feet (*fig. 2^a*), while da and db maintain the same dimensions as above, whereby not only X but the angles in front of a are defended. A still better defence is obtained by the arrangement on the line MN (*fig. 3*), where the curtains lying between the redans, bd , ba , are broken to the front, a perpendicular, $cb = 180$ feet, being erected at c , upon the lines constructed as in *fig. 2^b*, and the new faces, cb and bc , drawn. Is the time so limited that redans cannot be constructed the line MN (*fig. 4*) is broken only into salient and re-entering angles, db , dbd , by means of the perpendiculars, $cb = 180$ feet, where dd is 720 feet. Here, however, dead angles are made at X . Wherever time and ground permit the bastioned line, that is always the most advantageous arrangement (*fig. 8*), but the distance between the salients must be at least 300 feet and not over 720. To fortify the line MN in this manner, at the centre, c , of the polygon side, aa , the perpendicular, $c = \frac{1}{6} aa$, is erected, the lines, abx , drawn, the faces, $ah = \frac{2}{3} aa$, laid off, and the flanks hm ; let fall the perpendiculars upon the lines of defence, abx ; then mm are the curtains, which can likewise be broken forward, as in the front B , or even twice, as at Y , in the front C . For the straight curtains, as at D , the ditches must be dug out at cPF and at cO , else the shot coming from OP and F will not effectually sweep the salient, X .

d. THE PROFILE. The chief part in fortification is the breastwork, $dcbaf$ (*fig. 21*), which is to protect the defenders from the hostile shot. Its thickness is regulated by the penetration of balls into earth, and against musket balls must be not less than three feet, but against 12-pounder balls as much as 12 to 14 feet. The exterior slope, fa , is regulated according to the consistency of the earth, the steeper it can be the better. In front of the breastwork lies the ditch, and its profile Z is governed by the profile Y , as it is to furnish the material for the embankment; it is desirable, however, to give it depth rather than breadth. The slopes may be steep, as they are cut in the solid earth. The outer slope is called the

counterscarp, the inner the scarp. Between the breastwork and the scarp an off-set is left (*fig. 22 a d*) called the *berme*. The slopes must be revetted whenever possible, either with sods or with fascines, wicker-work, gabions or boards (*fig. 21, p p*), or with trunks of trees (*fig. 22, p p*). To secure the slope, *f g* (*fig. 23*), against being mounted, it can be palisaded, by setting trunks of trees, *w*, 10 to 12 inches in diameter and 10 to 12 feet long, 4 to 5 feet in the earth, at *g*, and sharpening them at the top. Trunks of trees may also be set obliquely in the *berme* space, as *t y* at *r* (*fig. 23*). These are called *fraises*, and are secured above by a transverse sill, *t*. The interior slope of the breastwork (*a b*, *fig. 21*) is very steep (12 to 18 inches) in order that the soldier may get near enough to the crest, *a f*. The banquette for the defenders, *b c*, is regulated in breadth according to the number of ranks it is to contain, and varies from 3 to 7 feet (*figs. 21, 22, 23, 24*). Its slope, *d c*, is regulated according to the elevation, and where the rampart is very high is made in steps (*fig. 22*). If the work is to contain cannon and the banquette is not wide enough to receive them, an especial banquette (*barbette*) is constructed for that purpose, provided with ramps. *Figs. 29—34* show such *barbettes*. *Fig. 29* is a simple *barbette*, *X*, upon a face or flank. *Fig. 30*, a ramp for mounting the *terre-plein* or broad banquette. The axis of the ramp, *w p v*, is perpendicular to the line of fire. *Fig. 31* is a narrow *barbette* for three pieces, *Y X Y*, in the salient of a bastion, which is cut off at *w v*; *t p* and *w v a a* are the platforms for the guns. *Fig. 32* is a wide *barbette*, for three platforms, *w v* and *t p*, for the pieces, *X* and *y*, in the bastion salient. *Fig. 33* is a narrow *barbette* for one platform, *w v*, for a single piece, *X*, in the salient. *Fig. 34* is a wide *barbette*, for one piece, *X*, for side defence, in the salient; *v w* is the *pau coupée* of the salient, *b z*, for infantry. If the *barbettes* are not high enough to permit the pieces to fire over the crest of the breastwork, *a f* (*fig. 23*, to fire *en barbette*), then embrasures must be cut for them which are wider in front than in rear, and are either direct or oblique on the line of fire. The inner openings of embrasures are blinded, either by hurdles set before them or by a shutter, *A* (*pl. 47, fig. 35*), where two posts, *g g*, with a cross tie, *m*, are secured into the parapet on which the shutter, *A*, hangs by hinges and staples, *x*. The sides of embrasures, called their cheeks, are revetted, either with fascines or gabions. The superior slope of the parapet, *a f* (*fig. 24*), is so drawn that its prolongation strikes the surface at the point *i*, unless there is upon the counterscarp a second parapet, *i k p g*, for defence, when the prolongation of the superior slope must strike the point *p*. The space between the counterscarp and the parapet, *i k p g*, is called the covered way.

If circumstances require that a work be so placed that from neighboring points it can be overlooked and fired into (commanded), then traverses *t k i l* (*fig. 36*) are constructed in the interior. The passages *e e* are covered by small mounds of earth (*tambours*) *z*. Such *tambours* are placed also before the entrances of works. Over the ditches light bridges, *y*, are carried.

e. INTERNAL DEFENCES. In great works there are other interior defences constructed, by means of which the garrison can maintain themselves for a time, even after the main work has been carried. Such works are called

redoubts; and these likewise may be either inclosed or open redoubts. They must always be large enough to contain two thirds of the garrison, and their form is governed by that of the main work. In inclosed works the redoubts are so placed (*fig. 25*) that their fire will principally sweep the dead-angles of the main work, as upon these points, which have only a secondary defence, the attack is chiefly directed. In open works, those especially which are so frequently thrown up to cover the passage of a river, the redoubts (*fig. 26*) are also constructed with fixed parapets, according to the importance of the main work; and a second redoubt, of palisades, is in such cases often added. If the works are less permanently constructed, the redoubts are made only of palisades (*fig. 27*), or of felled trees (*abattis*), or the so-called Spanish riders (*chevaux de frise*, *fig. 28*), beams, through which, in all directions, long stakes shod with iron at the points are thrust. To obtain in permanent works a better defence for the ditch, a subterranean block-house (*fig. 47*) is constructed in the counterscarp of the salients, under the parapet *f e d* (*fig. 46*, F, section, and *fig. 47* view), into which is a subterranean entrance from D, by the gallery G. X Y is the line of the horizon, *b a* the prolongation of the superior slope of the parapet. In slight works, a ditch-defence is obtained by setting the palisades *w* (*fig. 23*) a small distance from the scarp, and arranging them with loopholes.

f. DEFENSIVE MEANS WHICH ARE PART OF THE WORKS THEMSELVES. The covered way is the space *d d* from the edge of the counterscarp (*pl. 47*, *fig. 36*, front K K) to the breastwork which is thrown up in the open field, and affords a low defence. This construction is found only in large forts; for small ones only a simple embankment is thrown up, the glacis *w w* (*fig. 36*, front H H). The covered way is from eight to ten feet in width. To protect the garrison from being taken in flank by the fire of the enemy (enfiladed), cross-dikes (traverses) are thrown up on the long lines *u u* (*fig. 36* front L L). To strengthen the covered way, places of arms are established in the re-entering angles *d d* and *h*; in the salients they are found ready formed at *d d* and *v*; they must also be covered by traverses. The traverses lie close to the counterscarp, and are notched in the parapet of the covered way for the passage around them. Even where there is only a glacis places of arms are sometimes established in the re-entering angles *q q* (*fig. 36*, front H H); these serve, however, principally as mustering places for sallies, and are sunk in the natural earth. If it is desired to strengthen the defence still more, a second glacis is thrown up, *x x* (*fig. 36*, G X), which, however, must be commanded by the first, and therefore renders a higher parapet necessary.

Where it is possible the ditches should be provided with water, which, when the ground is swampy, is carried to its place by collecting ditches. At the foot of the glacis and in the dry ditches *trous de loup* are dug, holes of eight to ten feet deep, running down to a point, in which a sharp stake is set. Palisades, also, and *abattis* are good defences at the foot of the glacis and in the dry ditches, as they detain the assailants within the range of fire. The *chevaux de frise*, already mentioned in treating of redoubts, caltrops, and small thickly set stakes, driven firmly into the ground upon the

glacis, also effect this object ; and fougasses, a kind of mine which we shall soon describe, serve to destroy the assailing foe.

g. DEFILEMENT. In the disposition of fortifications care must be taken that they are not so placed as to be looked into from any adjacent heights. By exact measurements, therefore, the command must be determined, and the parapet made so high that it cannot be looked over, when the work is said to be "defiled" or "defiladed ;" or else traverses are thrown up, or such commanding heights as it is impossible to defile from are included within the circuit of the works. The method of defilement is as follows : Let it be the redoubt *m n o p* (*pl. 47, fig. 14*) which is to be defiled from the heights *A B B*, the first step is to establish the plane of defilement, *v t* (*figs. 15, 16*), so that it shall pass four feet six inches above the highest of the points *A B B*, and through a point *Z*, four feet nine inches above the plain at the foot of the glacis. In this plane *v t*, the crest of the ramparts *n* and *p* (*fig. 15*) must lie. These ramparts, however, would be very lofty, and yet not cover the defenders upon the lines *m p* and *p o* (*fig. 14*), but, by having recourse to a traverse *m o*, the height of the breastwork can be determined by the plane of the defilement *v p* (*fig. 16*), which gives the angle *p* command over the ground *Z*. By the traverse, *m*, the defenders at *p* are secured, while those at *n* are protected by the defilement itself. The dike at *D* (*fig. 14*) is only to be considered when it is so high as to command *p*, in which case a new plane of defilement, and also the traverse which must then protect *n*, are to be determined. Thus cases may arise where even two traverses are requisite.

h. CONSTRUCTION OF VARIOUS WORKS IN FORTIFICATION. As soon as the disposition of the work is determined, it is traced upon the ground after the plans, staked out, and then profiled. This last is done by setting up on all the lines profiles of laths (*pl. 47, fig. 18*) and strips of board, for which the profile given in *fig. 17* is the original. To effect this, the distances *v q*, *q o*, *o h*, *h k*, and *k m*, are staked off, and at each of these points strips of board, longer or shorter as required, are driven into the ground ; on these strips the proper heights are laid off, and then the slopes are given by cross laths, *d c*, *c b*, *b a*, and *f r*, tacked to the strips. After the accuracy of the profile is ascertained by measurement of the lengths *e f* and *x y*, the crest of the parapet is indicated by a stretched cord. During the construction, one third of the force is detailed to cover the work ; of the remainder, three sevenths are stationed in the ditch (*figs. 19, 20*), two of which sevenths, provided with shovels, dig at *K*, while the other seventh, at *L*, loosen the earth with picks. The shovellers, *K*, throw the earth into the berme, *r s*. Two sevenths of the force are stationed with shovels upon the berme at *M N*, to send the thrown-up earth backwards, and the remaining two sevenths stand at *O* and *P*, upon the parapet. Half of these, *O*, have rammers ; the others, shovels and spades ; and both spread the earth upon the parapet and form the slopes. If the parapet is very high, and the ditches, therefore, very deep, they work in two stages, by cutting a step along the counterscarp, as at *x* and *y* (*fig. 19*).

i. BLOCK-HOUSES. As block-houses are very effective for the interior

redoubts of open and inclosed works, which we have repeatedly mentioned, we devote some separate drawings to their illustration. *Fig. 53* shows the section, *fig. 52* the view, *fig. 51* a part of the ground plan of a small block-house, and *fig. 49* the view, *fig. 50* the section of the block-house in *fig. 44*. Upon piles, driven into the earth, sills are laid, and upon these the walls are formed of trunks of trees from ten to twelve inches thick, placed close together, side by side, and loopholed. The entrance is on the side most remote from the enemy. Inside there are two or three rows of posts, according to the depth of the block-house, which support the roof-frame joists, on which is then laid a double layer of beams, crossing each other in close contact, and projecting on all sides over the inclosing walls. Upon these beams comes a layer of earth to render the building bomb-proof. Inside, wooden bunks are placed for the accommodation of the garrison.

Fig. 42 shows a front of attack in a bastioned line, with a block-house as redoubt. The place-of-arms of the covered way, in the re-entering angle, is rounded, and the faces of the covered way cremailliered. *Fig. 44* is a lunette, having its gorge closed with palisades and with a block-house there, as redoubt. The salient angle of the counterscarp contains a subterranean block-house for the defence of the ditch. *Fig. 43* is a profile through the face of *fig. 42*, and *fig. 45* the profile through the face of *fig. 44*. In both, the disposition of a subterranean powder magazine is indicated. *Figs. 46* and *47* show the profile and elevation of the block-house for defence of the ditch, with the subterranean passage leading to it, and *fig. 40* is the profile through the bridge, *fig. 42*, with passage (postern), *f*, through and under the parapet to the covered way, *k*. *Fig. 37* represents the interior arrangement of a principal fort. Under the platform, *A*, in the re-entering angles of the four posts, lie the powder magazines, *P*. In the interior space of the work is the bomb-proof block-house, *B*, for the garrison, and within it the kitchen, *K*. *Fig. 39* gives a profile through the broken line, *ik*, *fig. 37*, from which the internal arrangement of the block-house is to be seen. *Fig. 38* is a profile, along *GH*, through the block-house and the powder magazine. *Fig. 40* is the bridge and entrance postern, in section, along the line, *sk*, in *fig. 37*, and *fig. 41*, a section of the kitchen along *gg*, *fig. 37*.

k. POWDER MAGAZINES. Powder magazines, always subterranean, are disposed too under that part of the rampart least exposed to attack, as in *pl. 47*, *fig. 44*. They are made dry by means of frame pieces and board revetments. *Fig. 48* shows the ground plan of a small, and *fig. 55*, of a large powder magazine. *Fig. 56* gives the section of *fig. 48*, and *fig. 54* that of *fig. 55*. It will be perceived that the entrance does not lead immediately into the magazine from without, but that, by means of a gallery disposed for that purpose, it is secured against the direct fires of the enemy. The height of the interior under the frame-piece is six feet.

2. Permanent Fortification.

The old manner of fortifying by means of long straight lines with towers

flanking them, was first abandoned in the sixteenth century, and it is believed that the Italians were the first to substitute bastions in place of towers. The works of earlier military engineers were improved upon by Vauban, and his system again by Cormontaigne in 1716.

Before we proceed further, we must explain some technical terms which have not been employed in treating of field fortification. The foundation of every fortification is the regular or irregular polygon, which is drawn around the place to be fortified, and whose side must not be greater than the effective range of small arms, as otherwise the flanking will be insufficient. By the breaking of these polygon sides into any figure soever arises the system of fortification. The exterior polygon is that which is drawn through the vertices of the salient angles; the interior polygon unites the vertices of the re-entering angles. The line which bisects an angle is its *capital*, and the portion of the fortification lying between two adjacent capitals is called a *front of attack*. The construction must take place always according to the exterior polygon, as otherwise it could not be determined where the bastion points fall. The angles made by the faces are called *bastion salients*; angles which the faces make with the flanks are *shoulder angles*, and the angles of the curtains and flanks are *flank* or *curtain angles*. If a part of the flank projects forward, to cover the rest lying back of it, this forms an *orillon*. The line from one flank to the opposite bastion salient is called the *line of defence*, and its length must not exceed the effective range of small arms. The rampart immediately surrounding the place to be fortified is called the *enceinte*, or *body of the place*, and the line along which the defenders stand is the *magistral*. All works lying in front of the enceinte, but within the covered way, are called *outworks*; if outside of the latter they are *detached works*.

The chief part of every fortification is the rampart, which consists of the parapet and the terreplein lying behind it, on which the artillery and defenders find room for position and movement. The breadth of this was formerly taken at 24 feet, but in later times it has gone up even to 42 feet. The thickness of the parapets proper must be from 18 to 20 feet, their height $7\frac{1}{2}$ feet, and their slopes governed by the natural fall of the earth; in bad soil they must be even greater ($1\frac{1}{2}$ of the height). The communication between the terreplein and the interior of the place is secured by means of ramps (*pl. 48, fig. 42*), which are cut in the slope of the terreplein. Of the outworks, the ditch which surrounds every fortified place is the first. The ditch may be either dry or wet; there are dry ditches, however, which can at times be put under water. If the bottom of a dry ditch is moist, a canal is established in the middle of it, the cunette, to carry off the water, and over this small bridges are laid. Ditches which can be inundated obtain their water usually from some river running by the place, and are then provided with sluices. These are stone dams (Batardeaux), which run across the ditch, and have a sluice in the centre, placed in a tower which is accessible only from the fortification. *Fig. 39* is the elevation of such a sluice-tower; *fig. 40*, the section of another; and *fig. 41*, the arched passage for the water. In the ditch lies, in front of the

curtain, the *tenaille*, and in front of this the *demi-lune* or *ravelin*, the construction of which will be given in describing the different systems. While the *ravelins* were made very small, works similar to *tenailles* were placed in front of them, running parallel to their faces, and strengthening them. In the same manner a work called the *couvre-face*, *counter-guard*, or *bastion shield*, was run parallel to and lower than the *bastion*. Of this more will be said hereafter. Works often employed in the earlier systems are the *horn works* and *crown works*. One front of attack, as it is called, forms a *horn work*; a *crown work* consists of two such fronts. Both may lie either before the *ravelin* or in front of a *bastion*, and are then carried back to the main work by long flanks. *Fig. 5* shows a *horn work* in front of a *bastion*, *fig. 8* one in front of a *ravelin*: *H* and *I* are the long flanks, which must be defended from the main work. *Figs. 6, 7*, are a *crown work* before a *bastion*; *figs. 11 to 16*, the same before a *demi-lune*: *G* is here one of the connecting flanks. Detached works are independent forts for the defence of single points which cannot be brought within the region of the *enceinte* or the *outworks*, and yet must be defended. They are disposed after the manner of *star forts* or as open works (*Lunettes*), and communicate with the main work by means of a covered way. With respect to the various systems of fortification according to which works have been disposed since the 16th century, the principal of these are as follows:

1. Gerhard von Herzogenbusch (Erard Bar le Duc) was the first who established fixed rules for fortification. In his system (*pl. 48, fig. 6*), the half *bastion* angle at *A* and *B* is 45° , and by setting this off in the capital for the polygon side, *ab*, the lines of defence, *af* and *bd*, are obtained. Bisecting now the angle of the half *bastion*, and drawing the lines *ag* and *bh*, these intersect the lines of defence in *d* and *f*, from which points the perpendiculars, *fe* and *cd*, are let fall upon the faces, and these form the flanks, *DD*, which are connected by the curtain, *C*. To draw the ditches, *F*, describe, from *a* and *b* as centres, circles having the length of the flank for radius, draw tangents to them from the shoulder angles *c* and *e*, which intersect at *E*, where, in the covered way, a place of arms is disposed. This system has sometimes *orillons*, as, for example, at *Amiens*.

2. Marolais, a Dutch engineer, constructed his system (*fig. 7*) for a hexagon, in the following manner, *ab* being the polygon side. The angle of the half *bastion* being fixed by Marolais at 40° , make the angles *abh* and *kab* = 20° , and draw the lines of defence, *af* and *bf*, which intersect at *e*. The length of the faces *ag* and *bi* is 288 feet, and from the points *g* and *i* perpendiculars, *dk* and *ch*, are drawn to the polygon side, *ab*. From the points *g* and *i*, set off, on these perpendiculars produced indefinitely towards *h* and *k*, angles of 55° , and join the points where the lines defining these angles intersect the capitals, by a line; this last parallel to the polygon side, will determine the length of the flanks and form the curtain. Ditches and places of arms are constructed as by Bar le Duc. Marolais usually placed in the ditch, which was then made wider, a *faussebraye* (or lower rampart), which, below the main work and parallel with it, ran round the whole *enceinte*.

3. The Chevalier De Ville, who lived under Louis XIII., improved the earlier methods, and fixed all bastion angles at 90° . De Ville constructed his system upon the interior polygon, and made the length of the flank equal to the half gorge of the bastion (*fig. 5*). For this he divided the polygon side into six equal parts, one part on each extremity being the demi-gorge of the bastion, AA, and the other four parts the curtain, C. By erecting perpendiculars at the two first points of division, he obtained the position of his flanks, BB, which he made equal to the demi-gorge, and thus determined the shoulder points, *k* and *c*. From these he laid off upon the prolonged capitals, angles of 45° , and thus obtained the points *a* and *b*, through which and the shoulder points he drew the lines of the faces, which intersect at *m*. To construct the orillon, he divided the flank into three equal parts, and drew, through the second points of division, *i* and *d*, and the points *a* and *b*, the lines *ah* and *be*, which intersect at *l*. Setting off now, from *d* and *i* towards *e* and *h*, $\frac{2}{3}$ of the flank, and drawing, parallel to the flanks, the lines *ef* and *gh*, the orillon was completed. De Ville, however, did not do away with the front part of the flank, but only established it somewhat deeper than the drawn back flank, whereby he obtained a double flanking. The ditch, *p*, was constructed as before mentioned, but De Ville made it pass round the place-of-arms, D, also, which he somewhat enlarged and called a ravelin (demi-lune), *opq*, whereby he obtained yet another small place-of-arms, *n*, in the salient angle. In the three systems hitherto described, all the flanks have the fault of giving a too oblique defence of the ditch.

4. Count Pagan divided his fortifications into great, medium, and small. For the medium (*pl. 48, fig. 8*), the polygon side *ab* was 1080 feet. This was bisected in *c*, a perpendicular erected at that point, $cd = 180$ feet, and the lines of defence *bdo* and *adp* are drawn. The faces *bh* and *af* of the bastions A and B were made 330 ft. and *dm* and *dn* each 192 ft. long. Drawing, then, *hm* and *fn*, we have the flanks and the curtain C. Pagan arranged three flanks, one behind the other, the foremost, *im* and *gn*, slightly elevated above the bottom of the ditch, the middle, *k* and *l*, at the half height, and the last at the full height of the bastions. The length of the orillons *hi* and *fg* he determined, after De Ville, by the lines *bg* and *ai*, intersecting each other at *e*, and the curtain received the breaks *no* and *mp* to make the second flanks longer. Sometimes there was disposed in the bastions A and B an elevated parapet *otq* and *p rs*, called the cavalier. F is the place of arms, and G the glacis.

5. Vauban's first system (*fig. 1*) is applied upon a polygon side, *ab*, of 600 to 1080 feet. In the centre of this the perpendicular *cd* is erected, made for the square $= \frac{1}{8} ab$, for the pentagon $= \frac{1}{7} ab$, for the hexagon, &c., $= \frac{1}{6} ab$, and the lines of defence *bk* and *al* drawn through *d*, *a*, and *b*. The faces *ae* and *bh* are made $= \frac{2}{3} ab$, and from *a* and *b* as centres, circles described with *be* and *af* as radii: where these cut the opposite lines of defence (at *k* and *l*) are the flank points; the flanks, *ek* and *fl*, and the curtain C can now be drawn. Vauban also made orillons, but gave them only one third the length of the flank. The first outwork which Vauban added was the tenaille, which he established at 18 and 60 feet distance

from the curtain and flanks, and parallel to these, the flanks of the tenaille being cut off by the lines of defence. Hereby arose a new curtain, D, and two half bastions, EF, in the ditch, lower than the main work. Subsequently Vauban convinced himself that flanks were inadmissible, and gave the tenaille merely two faces in the prolongation of the lines of defence, intersecting at *d*, placing a very short curtain between them. To the ravelin, G, Vauban gave greater extension, making the faces *m q* and *m p* = $\frac{2}{3}$ to $\frac{3}{4}$ of *ab*, and drawing them from the points *i* and *h*, which are 30, 60, or even 90 feet from the shoulder angles *e* and *f*. Afterwards he gave the demilune flanks, as in *pl.* 48, *figs.* 2 and 3, which, however, proved unserviceable. The gorge of the ravelin was determined, at first, by the prolongation of the counterscarp, afterwards, however, as it was exposed to the enemy's fire, cut off, as in *fig.* 2, and in the interior a redoubt disposed (*figs.* 2 and 3), which lay so high that its line of fire fell upon the banquette of the ravelin. The ditch (*fig.* 1) received in front of the bastion salients 90 to 96 feet breadth and was aligned upon the shoulder points, whereby the gorge of the ravelin was determined in *g*. The ditch of the demilune received at *o q* and *p n* from 72 to 80 feet breadth, and ran parallel to its faces. At *r*, when the ditch was dry, ran traverses for defence. The covered way he improved by defending the long lines, I, I, from the place of arms, H, by means of the traverses *ss*, also by enlarging it and the glacis.

Still more improved were the later systems of Vauban, viz. 6, that at Landau (*fig.* 2) and 7, at Breisach (*fig.* 3). For Landau (*fig.* 2) the construction upon the polygon side *ab* by means of the perpendicular *cd*, is the same as before; but between the bastions A and B there lies no curtain, the tenaille, C, is advanced to the point of intersection, *d*, and lies on the same level with the bastion; the faces, *qp* and *qo*, of the ravelin with flanks, G, are aligned upon the much advanced points *m* and *n*, and a redoubt, H, added; the places-of-arms, K and L, made as large as possible, the line, I, defended by several traverses and secured from enfilade, and the glacis thrown very far forward. Elevated behind the front of attack proper lie the bastion towers, FF, forming redoubts, and where the prolongation of the line of defence strikes these, is formed a second, retired polygon side, *fe*, upon which, by means of the perpendiculars, *g E*, &c., a new front of attack, *ehklif*, with two half bastions, D, and a curtain, E, is constructed. For the fortifications of Breisach (*fig.* 3), A are the bastions, B the tenaille, *ab* is the polygon side, *cd* the perpendicular. The faces, *op*, of the ravelin, F, which has a double redoubt, G, are aligned upon the points *f* and *e*, and the flanks tolerably long. The bastion towers, EE, are made much smaller, whereby the second front of attack, *ghiklmn*, obtains a greater extension, and the bastions, CC, as well as the curtain, D, receive a better defence. H is a large re-entering, and I a salient place-of-arms. The place K is contracted by the adjacent hornwork. L is a large glacis.

We have given, in *pl.* 48, various details of Vauban's systems, most of which are found usually in those of others, or may be applied to them. Bastions may be either hollow or solid; in the hollow bastion the interior

space is empty, and behind the parapet is an elevated terreplein. Then the revetment wall (*fig. 33*), which rises from the bottom of the ditch to the bottom of the parapet, and is terminated above by a projecting coping, has buttresses on the inner side (*fig. 21*, horizontal section through the revetment wall, *abcdefg*), and in rear of the same runs a subterranean gallery for mines, the magistral gallery, which gives access to the system of defensive mines, of which we shall say more hereafter. If the interior space of the bastion is filled with earth, it is called a solid or full bastion; it has then usually an additional raised work, the cavalier, and is provided with bomb-proof vaults (*casemates*). *Fig. 19* gives the horizontal section of such a bastion, *abcdefg*, having casemates in its interior space, of which *fig. 20* shows the vertical section along the line *ec* (*fig. 19*, seen from the gorge). The exit from the front of attack is always established in the centre of the curtain and is subterranean, being carried by a vaulted passage under the parapet. *Fig. 22* shows such a passage (sally-port, postern): *aa* is the revetment wall of the main rampart; *b* are the side walls, and *c*, the buttresses for strengthening the wall; *d*, a separate vault for muster-place. *Fig. 23* shows the longitudinal, and *fig. 24*, the cross-section of such a postern. Underneath this, usually, a drain is carried to lead off water. *Fig. 34* is a longitudinal section through the front of attack (*fig. 1*): *A* is the terreplein; *C*, the curtain with the attached bastion; *E*, the tenaille; *F*, the main ditch; *G*, the terreplein of the ravelin, whose parapet is *H*; *J* is the ditch of the ravelin, and *N*, the covered way with the glacis. *R* are the scarp and counterscarp revetment-walls; *I* and *G*, their slopes. The inscribed numbers are the measurements in feet.

8. The system of Vauban has been still improved upon by the French engineer Cormontaigne; his system remained for a long while, down to the time of Carnot and Montalembert, the favorite one, and many places were fortified by it. The enceinte, *ag hfb* (*pl. 48, fig. 4*), Cormontaigne draws, for the bastions, *AA*, and the curtain, *B*, in the same manner as Vauban, with the difference only that the flanks are perpendicular upon the lines of defence. To construct the ravelin, lay off, from the point where the counterscarps of the main ditches intersect (*fig. 1 g*), 360 feet on the perpendicular bisecting the curtain to *C*, and there is the salient of the ravelin, whose faces are aligned upon the points *k* and *i*, which are advanced 90 feet from the shoulder-points. In the ditches of the ravelin are placed the traverses, *K*. The redoubt, *c*, of the ravelin runs parallel with the main work 36 feet from it and receives flanks, *D*, which command the somewhat lower part, *L*, of the main work. *E* is a covered way, from the tenaille, *F*, to the redoubt of the ravelin. The salient places-of-arms of the covered way are defended by traverses, and in the re-entering, *H*, the redoubts, *I*, are established. The glacis, *M*, is shorter than in Vauban's system.

9. The system of Count Cohorn, a renowned engineer living in Holland at the time of Vauban, is of great value, especially for countries abounding in water. One of his fronts is represented in *fig. 10*. It is constructed on the interior polygon, its sides, *AA*, containing, for the hexagon, 900 feet. The demi-gorges, *Al* and *Ak*, are $\frac{1}{4}$ the polygon side, and the capitals, *AD*

and $A c$, are 450 feet long. From the points c and D the lines of defence are drawn to k and l , and, with $c k$ as radius, the arcs $k H$ and $l G$ described, from c and D , which form the flanks (usually drawn straight, however), and determine the shoulder-points, at the same time, at G and H ; the curtain is then $k l$. In front of this lies a species of tenaille, which Cohorn called the low curtain, and which is drawn by describing from c and D , with a radius of 840 feet, the arcs $o E$ and $p F$ between the lines of defence, and thus obtaining the flanks; the faces, $F H$ and $E G$, are then determined necessarily, and the curtain, $o N p$, is broken in the direction of the lines of defence. In the shoulder angles of the bastion, Cohorn placed casemated orillons, the details of which are shown in *fig. 25*: ^{1, 2, 3} are the casemates, and at $h z$ and $z y$ are loopholes and embrasures for the defence of the ditch; $a a a$ are vaulted buttresses. The orillon has its own small wet ditch, F , which is filled from the main ditch and over which lead the bridges, $h z$, to the orillon, and $g s$, to the dry ditch of the lower face and curtain. The parts of the enceinte hitherto described (*fig. 10*) form the lower work, only the curtain, $l k$, lies on a level with the (presently to be described) upper work. To obtain this, describe, between the lines of defence, from c and D as centres, the upper flanks $S M$ and $R L$, with a radius which is obtained by drawing a line parallel to the face of the bastion and 124 feet from it; the point where this intersects the opposite line of defence determines the radius $C' S$ or $D R$; afterwards the curtain receives the breaks, $k U$ and $l T$, in the direction of the lines of defence; the terreplein between the upper and lower fronts is dry, only in front of the low flanks and the orillons is the ditch wet. In the terreplein, palisades are set before the faces. The ditch runs with a breadth of 144 feet parallel with the faces of the enceinte. To draw the ravelin W , lay off, from the point where the counterscarps of the main ditch intersect, 330 feet towards W ; then, on each side of the capital, lay off an angle of 35° , which determines the direction of the ravelin faces; they are produced to the counterscarp. Within the ravelin lies the redoubt XYZ , parallel to it at 136 feet distance. In the terreplein of the redoubt a second redoubt is formed of palisades; in the dry ditch, also, in front of the redoubt, palisades are placed. D' is a salient place-of-arms of the covered way; A' , a re-entering; and these are defended in a peculiar manner, first, by the traverses, C' , and a double glacis, and again by the palisaded redoubts, B' (coffres). Cohorn has permitted some changes here and there in this system, so that a second and third system are recognised, but these changes are not important.

10. Herbort, the engineer of Duke Charles Alexander of Wirtemberg, has, in his system (*pl. 48, fig. 9*), retained the bastions, but introduced extensively crenelled galleries (galleries with loopholes). In the interior of the bastions, A , are found the redoubts, B , provided with crenelled galleries having earthen parapets above, which are separated from the broken curtain, $n o p$, serving for casernes, and likewise casemated, loopholed, and having an earthen parapet above. The curtain is flanked by two redoubts, $q q$, casemated, and covered with earthen parapets. The bastion orillons of the enceinte, $b f e g a$, lie somewhat higher than these redoubts, are case-

mated, and have earthen parapets. The bastions themselves have still a redoubt, *m*, in front of which lies the ditch, *kl*. The flanks, *r* and *s*, lie amphitheatrically one above the other. The ravelin, *z*, is arranged like the bastion, and has, at *c*, a blockhouse for the defence of the ditch. In front of the faces of the enceinte lie bastion shields, *couvre-faces*, with simple earthen parapets, in whose re-entering angles lie the lunettes, *x*, with the blockhouses, *u d t*; open to the ditch, *y y'* and *y''*, are blockhouses and traverses for the defence of the ditch.

11. Montalembert, at last, entirely rejected the bastioned tracé, and instead of this has directed against all the fronts of attack a powerful fire of small arms from several covered stories. His first system was designed for simplicity, and exhibited (*fig. 11*) only two long faces, *AB*, between which the curtain, *C*, was broken bastion-like, and had in front a kind of ravelin, *D*; *E* and *F* were the places-of-arms of the covered-way. The second system (*fig. 12*) has the enceinte, *a e g h f b*, constructed by means of the polygon side, *ab*, and the perpendicular, *cd*, after Cormontaigne; but the curtain, *C*, is separated and forms a bomb-proof, casemated caserne, which is either bastion-like as at *D*, or as at *E* leans against a tower redoubt. *Fig. 35* is a view of one half of one of Montalembert's towers. *Fig. 36*, the vertical section of the same. *Fig. 37*, the ground plan of one quadrant at the surface of the earth, and *fig. 38*, of the same through one of the stories. The bastions, *B* (*fig. 12*), have redoubts, *A*. The ravelin, *F*, is in its form, *lmnopq*, and its points of alignment, *k* and *i*, constructed after Vauban's second manner, and has a first redoubt, *G*, and a second, *H*. The third and most complete system of Montalembert is shown, for a regular square, in *fig. 13*, in the right half without the parapets. The sides of the square are drawn back in the centre, and here are found the casemated ravelin, *A*, of three stories, arranged above for open defence within and without. To these adjoin, next to the ditch, a crenelled, two story, casemated wall, *ab*, then an earthen rampart, *I*, then a crenelled wall, *cdc*, and behind this a tower, *E*, and last comes a third crenelled wall, *fgf*, in two stories. In the ditch lie four covered casemated caponnières, *G*, of three stories, with 27 cannon. Beyond the ditch lies an earthen rampart, *hiki h*, surrounding the whole, with a free standing crenelled wall in front of it, *lmnm l*, which is casemated in the re-entering angles, *mnm*, and has there the entrances, *o*. In front of *G* are found raised casemated faces, *p q*. In the re-entering angles of the earthen rampart, *lmnm l*, are built lunettes, *H*, of earth with casemated flanks, *I*. The lunettes have redoubts, *k*, in the form of free standing walls. Finally, a general covered-way, *rstuvutrs*, with the glacis, covers the whole fortification. *Fig. 17* shows the profile of this fortification, along the line, *LM*, of the ground plan, and *fig. 18* along *RS*, wherefrom the interior arrangement of the works can easily be perceived. *X* is the head of the tower at *H* in the ground plan.

12. The system of Carnot (*fig. 15*) consists of a general enceinte formed by a great wall, *baccab*, without any revetment of earth, made up of a series of redans, whose flanked angles, *b*, lie 600 feet from one another, and whose faces, *ab*, form right angles with the flanks, *ac*. The wall is 26 feet

high, 9 feet thick, and crenelled in two stories, save on the flanks, which have embrasures and mortar casemates. Thirty-six feet from this wall is the foot of the enceinte proper, *mm*, which is composed of bastions and curtains, covers the enceinte, *B*, and has in front of it the wall, *pqrj*, 6 feet thick, and 24 feet high, crenelled in one story, which is united with the above mentioned curtain by defensive casernes, *k*, having earthen parapets above. In front of the curtain lies the tenaille, *tt*, whose faces are 360 feet long. In the re-entering angle of this is a ditch caponniere, and at *g* are passages in the flanks. Between the couvre-faces, *I*, is erected the cavalier, *L*, and in front of this lies the ravelin, *H*, for sallies and to cover the couvre-faces. The profile (*pl.* 48, *fig.* 32) along *NM*, shows the general enceinte with the earthen rampart, *B*, the enceinte wall, *C*, the tenaille, *e*, and the ditch caponniere, *vw*. *Fig.* 31 is a profile along *OP*, and shows the cavalier, *L*, the demi-lune, *H*, and the glacis, which slopes towards the works (*en contrepente*); the profile, *fig.* 30, is along the line, *QR*, and shows the bastion, *h*, the wall, *q*, the couvre-face, *J*, and the glacis.

13. The system of Dufour (*fig.* 16) is based in general upon the bastion system. The enceinte, *ae g h f b*, of bastions, *A B*, and curtains, *C*, is constructed by means of the polygon side, *ab*, and the perpendicular, *cd*, and has in front of the tenaille, *E*, a caponniere, *D*, for communication with the ravelin, whose faces are constructed as by Cormontaigne. In the salient angle of the ravelin is found a cavalier, *F*, for protection against enfilade. The ravelin has besides the cut-offs *G* and *H*, which serve for defence of the ditch as well as for redoubts to the places-of-arms, *I* and *K*. The ravelin faces consist of an earthen rampart, the flanks of crenelled walls, the covered-way of the ravelin has four traverses.

14. The system of the engineer Chasseloup (*fig.* 14) has chiefly in view the protection of the defenders at every moment against the effects of the hostile fires, and contains much covered space. His polygon side has 1800 feet. The main enceinte, *ab c d d c b a*, is bastioned, and has its faces, *ab c*, broken, that they may not be ricocheted. For the protection of the advanced works there are, in the great bastions, casemated cavaliers, *c*. The branches of the covered-way have such a direction, that by means of these several direct fires are brought upon the capital, and in the places-of-arms of the covered-way are established bomb-proof redoubts, *A*, covered with earth. To reach the covered-way more conveniently, ramps, *r*, are placed at the necessary points. The salient angle, *D*, of the ravelin, is the apex of an equilateral triangle, the ground lines of which are determined by two points, on the bastion faces, 291 feet distant from the shoulder angles. The ravelin faces, made up of coupures (cut-offs), as well as the faces of the redoubt, *E*, run parallel to the lines of this triangle. The redoubt, *E*, is a casemated lunette, covered with an earthen parapet, of one story, save in the gorge, where it has two, and separated from the enceinte by the glacis, *W*. The main work in Chasseloup's system is the work *F*, which possesses great capacities for defence. The faces are covered by the glacis, and the flanks by the caponnières, *P*; it is unassailable from a distance, and first becomes effective when the enemy has arrived upon the glacis, *W*. Chas-

seloup has protected all parts of the enceinte where breaches can be established by vaulted buttresses and magistral galleries. To prevent the enemy from making the passage of the ditch in the direction of the breach towards the faces, Chasseloup has provided the great bastions with the cavaliers, C, which must be separately taken. The elevated casemates, *k*, first become effective when these cavaliers are attacked, and in consequence of this fire and that from the cavalier, *c'*, the enemy is compelled to make a lodgment on the breach, which is swept from *c'*; *c''*, with the casemate, *g*, supports *c''*, and covers the exit *h*. At *e* are bomb-proof sheds, for the pieces from *c'* when not in use; *f* are vaulted casernes for the protection of the ditch and of the exit. *Pl.* 48, *fig.* 28, shows a profile along the line, N O, through the main enceinte and the tenaille. *Figs.* 26 and 27 show two profiles, along the lines G H and K I, of the redoubt of the demi-lune, and *fig.* 29 a profile along the line, L M, of the redoubt of the places-of-arms of the covered-way and the attacked traverses. Alessandria in Italy is fortified upon Chasseloup's system.

F. ATTACK AND DEFENCE OF FORTIFIED PLACES.

In ancient times, when the art of fortification was yet in its infancy and when all siege engines were exceedingly inefficient, a siege was a most tedious affair; instances are not wanting where one has lasted even for many years. A cursory survey of the ancient method of carrying on a siege may here precede our passage to modern times. The fortification to be besieged was shut in on all sides, to cut off its communications and means of subsistence; for this purpose it was surrounded with double walls of circumvallation, between which the besieging army encamped, and by means of which it was defended, as well from the assaults of the garrison as from exterior attacks. *Pl.* 41, *fig.* 2, shows the circumvallation which Scipio established when he besieged the city of Numantia, secured by its position upon a mountain from storm. If, on the contrary, a fortress was to be stormed, it was then approached, much as at the present time, by means of trenches. *Fig.* 3 gives a representation of Cæsar's siege of Massilia; here stone siege towers (*pl.* 35, *fig.* 2) were first built, which served at once for guard and watch towers and for casernes. From these the fortress was gradually approached by means of covered communications (*fig.* 7 A), and with palisades and mounds of earth (B), a parallel was established as at present. The ditch being attained the tortoises (C) went forward, by means of which the ditch was filled up and a dike constructed for bringing up not only the battering-ram but the movable siege towers to the foot of the wall, and for the passage of the besiegers to the assault of the breach. All works were carried on, before the completion of the galleries of communication and the parallel, under cover of the movable screens, DD. In the Middle Ages also this method of siege was practised, but then many subterranean galleries were wrought, which must have been of great dimensions, for we know that in the fifteenth century single combats on horseback were

carried on in such mine galleries, as for instance the one between King Henry V. of England and the Sire de Barbazan, commandant of Melun, in the year 1420.

In our own times the reduction of a fortified place may be effected either by blockade or investment, by surprise, by an unexpected open attack, by bombardment, or, finally, by a regular siege. What is meant by the four first methods is explained by their names; we have to do, therefore, only with the last.

1. ATTACK OF FORTIFIED PLACES.

If a fortress is to be formally invested, it is first surrounded, to cut off all succor and assistance, with a line of circumvallation, established at about two miles distant, and constructed according to the rules of fortification; or at least all roads running to the place are taken possession of, and all the adjacent villages and important localities. At the same time, depôts for artillery and siege material, magazines, &c., are established. From this line of circumvallation, or from the occupied points, approaches are now made, by means of ditches of communication (*boyaux*), upon the prolongation of the capitals of the front destined to attack (*pl. 49, fig. 1*), which ditches run in zigzag, so as not to be enfiladed from the place. When within 1800 feet of the fortress, that is, near the foot of the glacis, a trench is established, the first parallel, which surrounds the whole front to be attacked. The first parallel serves as a place of assemblage for artillery and infantry, and for the location of those batteries from which curved fires are to be given, that is, for the enfilade and ricochet, and for the mortar batteries. These batteries should enfilade, not only the long lines of the front attacked, but also the curtains of the adjacent fronts. Not to interfere with the communications, the batteries are established, not in, but before or behind the parallel. From the first parallel approaches are again continued by *boyaux* in zigzag still upon the lines of the capitals, until a distance of about 900 feet from the covered-way is attained, when the second parallel is established, which, as well as the first, must be secured from attack at the extremities. In this parallel, which serves properly only as a place for rest and assemblage, batteries are seldom established, at most some elevated counter-batteries, and especially mortar batteries. Still approaching, by means of the *boyaux* (*pl. 49, fig. 3 dd*), the third parallel, *gg*, is established near the salients of the covered-way, and in this are placed the counter-batteries, *x*. Between the second and third parallels, a half parallel is usually established (*figs. 2 and 4*), which incloses the bastion of the attacked front, and serves to cover the further advance of the *boyaux* by a fire of small arms, or to attack with the fire of artillery points which could not be properly reached from the second parallel. When approaches are continued from the third parallel, upon the line of the capitals, against the salients of the covered-way, high masses of earth are thrown up on the right and left of the line of the capitals, *the trench cavaliers* (*fig. 3 hw*), by

means of which the besiegers can look into the places-of-arms of the covered-way. The salients being reached, the *crowning of the covered-way* is established, parallel to the crest of the same, and here the breaching batteries are placed (*fig. 2*), by means of which the revetment wall of the front of attack, the salients, L, of the ravelin, the two bastion salients, AA, and the two shoulder angles, BB, are sought to be destroyed. The covered way being cleared of the enemy, subterranean galleries, *mn* and *wn* (*fig. 3*), are dug, leading out from the crown to the bottom of the ditch, or to the level of the water in it, and the descent into the ditch is begun, from which the passage of the ditch is effected, either by a covered-way, or by means of a dyke or a bridge. The breach being reached, a lodgment is effected upon it, and from thence upon the different works to be taken.

1. **WORKS OF THE TRENCHES.** The lines by means of which a siege is carried on must, as they are constructed under fire of the enemy, be very hastily made. The slopes towards the foe remain unworked; the interior ones, however, must be very steep, wherefore they are supported usually by gabions. The trenches nearest the fortification are called saps, of which there are various kinds. 1. The *Uncovered sap* is a simple ditch, 3 feet deep and 18 feet wide, having, on the side towards the enemy, a parapet with a banquette. 2. The *Flying sap* is carried on under cover of gabions, 3 feet high and 2 feet in diameter, placed by the laborers immediately along the trace. Upon the gabions, fascines or sand-bags are placed, until the parapet is $4\frac{1}{2}$ feet high. The ditches are 3 feet deep, and 9 feet wide at the bottom. A banquette, 1 foot wide, is constructed. 3. The *Half sap* has no banquette, and there are only gabions, filled with earth, sap-fagots, or sand-bags. 4. The *Full sap*. For this, each sapper brigade consists of four men. The first rolls before him a sap-gabion, A (*pl. 48, fig. 5*, view and ground plan), sets up the gabions *x*, side by side, towards the fortification, and digs the ditch, *y*, $1\frac{1}{2}$ feet wide and $1\frac{1}{2}$ deep; the succeeding sappers deepen and widen the ditch each 6 inches, and place between the gabions sap-fagots, *p*. Ordinary laborers then complete the ditch to 3 feet deep and 18 feet wide and place the fascines, *z*. 5. The *Old sap* (*fig. 6*) is also cut in steps by four sappers following each other; its ditch is 4 feet deep and 6 feet wide; the earth is employed for the parapet, B. When the *old sap* is employed to cut into the parapet of a hostile work, the ditch is made only half as wide, and at the foot of its parapet two sand-bags, *z*, are laid one upon the other, for a banquette. A blind of fascines is also established upon the parapet. 6. The *Covered sap* (*fig. 7*) consists of two full saps, A, running parallel to each other at 4 feet distance, over which, after the masses of earth, M, are thrown out, a cover of beams, *k*, is laid, and thereupon fascines and sand-bags, and, finally, a layer of earth, D. 7. The *Single traverse sap* (*fig. 8*) is a full sap, A, which advances, not in a direct line, but in rectangular or snake-like turns. It is constructed like the full sap, but as it is usually employed for crowning the covered-way, the traverses, *z*, are placed in it. At the securest points are made ramps, *x*, in the rearmost slope of the trench. 8. The *Double traverse sap* (*fig. 9*) consists of two single ones, running

parallel to each other at 4 feet distant. It is 10 feet wide at the bottom, and is employed in advancing upon the capitals of the work. The double sap being completed, ordinary laborers throw out the intervening mass of 4 feet thickness of earth. 9. The *direct double sap*, or *double sap with tambour traverses* (*fig. 10*), consists of two *single traverse saps*, the parapets of which are turned outwards, and which run parallel to each other, 12 feet apart. At fixed points, A, the one sap turns at right angles to the right, the other to the left, and then to the left and right twice, until they again come together, and so on; thus arise the 24 feet traverses, B, which cover the passage, C. The masses of earth, G, are thrown out afterwards. These saps go out from the third parallel upon the salients of the covered-way.

If the ground is unfavorable for the sap, various means must be applied. Thus, *a*, on rocky ground, where there is only one foot of earth (*pl. 48, fig. 11*), from two to three rows of gabions are set up, one foot from the trace, and filled with the earth which is at hand. If necessary, the parapet is heightened by the fascines, *yy*, and the banquette made of sand-bags, *z*, or several rows of gabions, *x* (*fig. 12*), are placed one on the other, and the banquette, *z*, made of fascines. *b*. Upon *naked rock* (*fig. 13*) the materials for filling must all be brought. Several rows of gabions, *x*, are set up and filled with sand-bags, *y*, with which also the parapet is completed, and a banquette, *z*, made. If, on such ground, a sap is to be carried forward under fire of the enemy's small arms (*fig. 14*), then the blind, A, is set up before the commencement of the work, and only under its cover is the parapet, B, to be constructed of gabions, *x*, and fascines, and of the earth brought from the rear. *c*. On marshy ground (*fig. 15*), if at a distance from the place, a dyke, *ab*, is constructed of water-fascines laid crossing each other, and the required earth taken from the ditches, *qq*. The parapet, *x*, is 6 feet high, of fascines with earth, and the banquette, *z*, of fascines or sand-bags. If the work is under fire (*fig. 16*), a dyke, *ab*, is made, like a sap, behind a rolling gabion, and as soon as it is completed the parapet is constructed of three rows of gabions, *x*, and an upper row, *y*, but the banquette is made of sand-bags, *z*. If the soil is only swampy in parts, the communications may be preserved over these by means of wooden trestles, *m* (*fig. 17^a*, front view, *fig. 17^b*, side view), which are pressed down into the soft earth, bridged over, and covered by the blind A. *d*. Upon overflowed ground, the construction is as in *fig. 15*; but when water is found at the depth of two feet, the parapet is built of earth, *x* (*fig. 18*), taken from the ditches, *qq*, run in front and rear. When this work is done under fire (*fig. 19*), the blind, A, is set up in front, and the parapet, *x*, is made, either of gabions or fascines entirely, or earth is thrown up in aid from a ditch run in the rear.

2. WORKS OF THE THIRD PARALLEL. The third parallel, *gg* (*fig. 3*), being completed, approaches are pushed forward by the direct double sap, *y*, and, on arriving within about one hundred feet of the places-of-arms of the covered-way, curved trenches, *oo*, are carried to the right and left, from the corners *m m*, until they reach the prolongation of the faces of the covered-

way, and here are erected the trench cavaliers, *h i k w*. To build these on the scarp of the sap-ditch, *q* (*fig. 20*), a gabion, *b*, is set and filled with earth, then the ditch is widened for the parapet, one or two rows of gabions, *c*, are placed, and upon these the gabions *d*, which are covered with fascines, and thus the parapet carried still higher. The banquette is made with two or three steps of fascines or sand-bags, *k*. After completion of the trench cavaliers, *h i k* (*pl. 49, fig. 3*), two saps are carried out, from *o* towards *x*, 16 to 24 feet from the crest of the covered-way, and the crowning of the covered-way is constructed with the traverses *b*. While the breaching batteries are here disposed and executed, the descent into the ditch is begun, which goes, in dry ditches, to the bottom; in wet, to the level of the water. It may either be covered, and formed in steps, or covered and an inclined plane, or open. When there is a good loamy soil, the first construction is chosen (*fig. 21*); the angle of descent is determined according to the horizontal distance, *A b*, from the point *a*, and the height of the counterscarp-revetment, *K*, at *A D*, allowance being made for the horizontal piece, *D m*, to the bottom of the ditch, and the number of steps is fixed. Then, in the lodgment, *Q*, the slope, *Q s*, is excavated, so that when it comes to the slope, *X*, it is three feet below the line *A Z*, and now begins the excavation of the descent, which is made seven feet high, and five feet wide. The commencement is made by setting up a frame, *c g w g* (*fig. 22*), as soon as the excavation has been carried one foot. Then it is dug two and a half feet further, and the second frame, *h*, set fourteen inches deeper. The two are connected by laths, *d*. Then two-inch planks, *y*, are driven in behind and over the frame, until the whole gallery is sheathed. The construction is continued in this manner, forming the steps, *c o p*, until the point *m* is reached, whence the passage is horizontal; the revetment wall, *K*, is broken through and supported by stones. The descent after the second manner is made open. For this purpose a blind (*fig. 24*) is used, which consists of two side-pieces, *x*, and the transoms, *y* and *z*. In the oblique excavation, which goes on constantly behind a traverse (*fig. 23*), the earth is thrown to the sides; as soon as it has advanced about twelve feet, the blinds (*fig. 24*) are placed, and over across these the roof beams, *b* (*fig. 25*), which have notches at *r r*. Upon these come three rows of fascines, crossing each other, and then three feet of earth. The revetment-wall being reached in one or the other manner, the passage of the ditch is commenced, which for dry ditches is simple. In wet ditches a dike is constructed (*fig. 23*), by throwing in stone, *D*, and laying water-fascines, *g k o*, secured by pickets of the breadth required, and two feet above the level of the water. The completed portion of the dike is covered by a parapet of gabions, sand-bags, and fascines, *x R v z*. If, instead of a dike, it is preferred to construct a floating bridge (*fig. 26*, view, *fig. 27*, ground-plan), then hurdles, *a*, of fascines are first laid to the breadth required; crosswise upon these, a second layer, *g*, and then the third hurdle layer, *h*. Upon these come two beds of sleepers and stretchers, crossing each other, *x y* and *w o p*, the fields of which are filled up with brushwood, and upon this is laid a bed of fascines, *k*. It is covered by a parapet, *R V*, as in the case just described

3. CONSTRUCTION OF BATTERIES. For the building of the requisite batteries and the work of the trenches, various implements and materials are required, which are represented on *pl.* 50. To these belong the tracing-line (*fig.* 7), the mason's level (*fig.* 8), the square (*fig.* 9), the plummet (*fig.* 10), the mattock (*fig.* 11), the spade (*fig.* 12), the hand-rammer (*fig.* 13), the two-man-rammer (*fig.* 14), and the scraper (*fig.* 15) for levelling the slopes. Gabions (*fig.* 18) are made by setting up the requisite number of stakes, in a circle of the proper dimensions, in the earth, and then interweaving them with flexible twigs (*fig.* 16^a, view, *fig.* 16^b, ground plan). Sometimes in the weaving, wooden circles (*fig.* 17^a) are intermingled, whereby the work goes on more rapidly. The basket being finished, the upper layer is bound with withes (*fig.* 17^b), so that the basket-work may not come out. Every gabion has two anchors (*fig.* 19) to fasten it in the earth. Fascines (*fig.* 23^b) are made upon a fascine-horse (*fig.* 20), of slender and straight brush-wood, fifteen feet long and one foot in diameter, and bound at every fifteen inches with withes. For this purpose they are choked upon the choking-frame (*fig.* 21) by means of the fascine-choker (*fig.* 22), and tied immediately, close to the choke. Sap-fagots (*fig.* 23^a) are only three feet long; at *a* and *b* they are tied, and a picket-stake is thrust through them. Sand-bags are of canvas, and filled with sand; are one or two feet long, and one foot thick; they are of various forms (*fig.* 24^{a,b}, and *fig.* 25).

Siege batteries divide into first and second batteries. The first are to silence the enemy's fire, and destroy his means of defence; the last are to effect breaches. If the front of a battery forms various salient and re-entering angles, it is called an indented battery, or battery en *cremaillère*, A B (*fig.* 46); but if part of the battery, A B (*fig.* 47), say *f g h*, must lie further back than *i k*, it becomes a broken battery. Is the ground boggy, and a battery to be established behind the dike A (*fig.* 2), then the wooden bar-bette, *a b*, is constructed, and we have a scaffold battery. Masked batteries are those whose embrasures are first opened when their fire commences. If the ground rises terrace-formed, and upon the higher part, *a b* (*fig.* 1), some pieces are placed, such a battery is said to be in tiers. If the *terre-plein*, *a b* (*fig.* 37), forms the floor of the battery, it is a horizontal; but if its floor lies below that, it is a sunken battery (*fig.* 33); and a raised battery when its pieces stand higher than the horizon. A battery which stands perpendicularly opposite the point fired upon is a direct, every other an oblique battery. The pieces stand in the batteries from 12 to 18 feet distant from each other, and there must be from eight to ten feet clear space in rear of them. In the breaching batteries, however, the pieces stand closer. The thickness of the parapet is, according to the consistency of the earth, from twelve to twenty feet, and its height for horizontal batteries from six to eight feet. The embrasures are either half or wholly cut out. *Pl.* 50 *figs.* 26 and 27, are wholly cut out; *fig.* 33 shows one half cut out, the sole *if*, meeting the superior slope at *f*, and the wedge, *x*, not being removed. The ricochet and howitzer batteries receive such embrasures, as they fire only in high curves. The earth for the batteries is obtained from the ditches, U (*fig.* 30), excavated in their front and rear. Is a battery so

placed that it can be enfiladed from the fortress, then its flank is covered by an epaulement, or else broken and mounted with guns. If the battery is not in the parallel, it must be united with it by ditches of communication (N); if in it, then a ditch of communication is carried round in the rear (N, *fig.* 32). All pieces stand in the batteries upon wooden platforms. These platforms (*fig.* 29, side view, right; upper view, left) consist of three sleepers, *hhh*, upon which the platform planks, *ppp*, are bolted down; a sleeper, *u*, being substituted for the last, to check the recoil. For the safe preservation of the ammunition, bomb-proof powder-magazines are constructed within batteries (D, *fig.* 30), large enough to contain the supply requisite for one day's service. In mortar and howitzer batteries, a separate place, E, is excavated for the shells and howitzes. All these magazines are connected by galleries (*qk*) with the interior of the battery.

Before the actual construction of a battery can be commenced, its location in the parallel must be determined, its position above or below the horizon, the direction of its axis of fire, the number and kind of its pieces, and the circumstances under which it is to be built, as well as the materials which are to be employed. The earth is obtained usually from ditches practised in front and rear of the battery; as, however, most of the slopes require to be steeper than the natural slope of the earth, a revetment must be given to them. For this purpose, fascines and gabions are employed. *Fig.* 28 gives the interior view of a horizontal counter-battery, which is revetted to the level of the embrasure soles with fascines. These fascines are fastened against the parapet, as shown in the section (*figs.* 26, 27), by means of anchors from two to five feet long, and anchor-stakes, which must extend so far into the parapet as to be within the natural slope of the earth. The right half of *fig.* 28 shows the fascine revetment continued to the superior slope of the parapet, while on the left this revetment is effected by means of gabions, which must also be anchored, as shown in *fig.* 19. The sole of embrasures is never revetted, but their sides (cheeks) may be revetted either with fascines (*fig.* 26) or hurdles (*fig.* 27). We will now describe some particular kinds of battery, and give the details of their construction.

To construct a horizontal breach or counter-battery under the grape and musketry fire of the enemy, the method of procedure is as follows: Let the battery (*pl.* 50, *fig.* 42, ground plan, *fig.* 43, section) be destined for four 12-pounders: the front, GH, according to the line of direction, RL, being oblique to, and 120 feet distant from, the second parallel. From the two points, *n*, in the parallel, W, the full saps, *n* G and *n* H, are carried in the directions G and H; the sappers then proceed parallel with R L to *pp*, inclosing a space large enough to yield earth for the battery; then the sappers approach each other from the two opposite points, until the sap, *pp*, is completed; and at GH a flying sap is thrown up to determine the fire line. The axes of the embrasures are then staked out, the breadth, *bb*, of the barbettes, A, marked off; between them the ditches, *mo*, running towards W, and on the outside of the two outer pieces the twelve-feet wide ditches, *st*, running in the same direction, are dug out. Having arrived at *t* and *o*, 38 feet from GH, the whole mass of earth, U, lying in rear of the battery, is

dug down three feet, and applied to the formation of the breastwork. Meanwhile other workmen establish between the barbettes, A and GH, a sap with gabions, z, which, filled with earth, afterwards support the sleepers of the platforms. The ramps, B, are also dug, and the mass of earth, U, three feet deep, in front of the battery, is thrown up on the parapet. In rear of the battery, two magazines, D, are established. The line of direction of an embrasure, when the parapet is completed, is determined, under the hostile fire, as shown on *pl. 49, fig. 36*. To the laths, *ab*, the rods, *ac* and *bd*, are fastened, the laths laid upon the superior slope, in rear, exactly on the middle line of the embrasure, and by moving the foremost end of the rod, *bd*, sighted into line, this line is prolonged backwards by sighting-in the stakes, *ef*. The direction of the cheeks (*pl. 50, fig. 3*), *ce* and *df*, is obtained by laying off upon the prolonged line of direction, *ab*, from seven to eight feet, and digging out the cheeks in the prolongation of *gc* and *gd*. If the line of direction of an already completed embrasure is to be changed, a new line of direction is first determined, and then either the embrasure alone is merely moved (*fig. 4*), or the parapet is cut into, or an offset made upon it (*figs. 5, 6*). A horizontal battery in the parallel, built out of the range of the enemy's fire, is shown in *fig. 44*, which gives the ground plan, and *fig. 45*, which presents the section. W is the parallel, GH the fire line, A the battery platforms, U the ditches, N the ditch of communication in rear of the battery, BCE are entrances, D the magazines. Of a horizontal battery in rear of the parallel (*fig. 40* shows the ground plan, *fig. 41* the section). W is the parallel, GH the parapet, UU the ditches of communication, which are protected by the parapets, M; D are the magazines, V the ditches; the piece, NO, of the parapet of the parallel, is cut out and covered by the barbettes, PP. *Fig. 32* gives an example of a sunken battery in the parallel. It is for three 12-pounders and one mortar. GH is the parapet (with embrasures according to *fig. 33, if*); B is a traverse, which separates the mortar from the cannon; N the ditches of communication, and D the magazines. *Fig. 38* is the ground plan, *fig. 39*, the section of a sunken battery, oblique in front of or behind the parallel. The signification of the letters is the same as in the preceding figure. GI is a piece of the parapet, which is raised higher to cover the battery. The arrangement of the elevated battery is shown by the ground plans (*figs. 34, 36*), and the sections (*figs. 35, 37*). Here, a piece of the parapet on the side towards the hostile fire must always be carried up at the same time for a cover. In *figs. 34* and *35*, the pieces fire en barbette; in *figs. 36* and *37*, through embrasures. *Fig. 31* is a rear view of a battery of 24-pounders before the Algerine fortress of Constantine.

2. DEFENCE OF FORTIFIED PLACES.

So soon as the front of attack is known, it is properly armed, and embrasures are everywhere cut, when the construction of service magazines, for daily use, is at once proceeded to. *Fig. 48* shows the arrangement of such a magazine, on a dry bottom. The timber-work is composed of the sleepers,

a, the posts, *b*, the cross-pieces, *g*, and the string-pieces, *c*, the lining of the boards, *e*, and the pieces, *d*. Upon the string-pieces, *c*, and the roof-beams, *g*, the fascines, *hh*, a bed of loam, *l*, and finally a bed of common earth, *K*. The roof is braced by the struts, *m*, which are mortised into the sleepers, *n*, and the whole structure is protected by the embankment, *m*, against the hostile shot. If the bottom is moist, a foundation is requisite according to *fig. 49*. The gates are all barricaded; bomb-proof barracks are built; and all the parapets of the covered-way made accessible by means of sally-ladders, *A* (*fig. 50*), supported upon posts, *x*. The next step is the arrangement of cut-offs in the attacked bastions, ravelins, and places-of-arms. If the bastions are hollow, it is best to close the gorges by a straight line, but for full bastions the proper cut-offs are shown in *pl. 49, figs. 28, 29, 30, and 31*; in the demi-lune a redoubt, *A*, is placed (*fig. 32*), with flanks, *pq*, and in the faces the coupures, *vw*. The branches of the covered-way are strengthened by the double palisades, *w* (*fig. 33*), between the traverses, *P* and *V*. *Fig. 34* gives the ground plan of a wooden tambour in the salient place-of-arms; *fig. 35*, its section. The interior space, *p*, of the tambour is so narrow, that shells falling upon the roof-screen, *w*, roll over the counterscarp into the ditch.

G. PIONEER AND PONTOON SERVICE.

1. MINES.

Thus far we have treated only of attack and defence above ground; but there is a subterranean warfare also, carried on by means of mines, and this is the duty of the corps of sappers and miners or pioneers, and its rules form a separate department of engineering. If gunpowder be inclosed in mason-work, earth, or rock, and then fired, the explosion drives away all the parts which can yield. Such an arrangement, so prepared as to be fired at any instant, is called a mine; the inclosure containing the powder is the chamber, but the chamber itself when filled is the oven (*fourneau*). Mines are employed to blow up the walls of the fortification, the works of the besiegers, and in case of necessity part of their troops. In the practice of mining, a shaft is first sunk, and from its bottom a gallery, the mine-gallery, carried out to the spot where the *fourneau* of the mine is to be placed. To sink a shaft, a curb (*pl. 51, fig. 5*), *a b c d*, whose cross-pieces lap eighteen inches over each other, is first sunk; the excavation continues until the second curb, *a b* (*fig. 6*), is laid, and then boards, *a* (*fig. 4*), are thrust down between the curbs and the earth. Between the boards, *a*, and the second curb come wedges, and the two curbs are connected by strips, *b*. The excavation is now continued to the third curb, cased, and so on till the shaft is deep enough. The curbs are placed four or five feet from each other, the two last, however, being always the height of the intended gallery apart. The side of the shaft, when this is to lead out, is not cased, but the

first frame, *c* (*fig. 9*), (chassis) is placed in the earth. The excavation is now carried horizontally, placing new chassis, *ef*, every two or three feet, and casing with boards as in the shaft, but only on three sides. For earth of very loose consistence the chassis *abc* (*fig. 7*) is employed, which is put together in the gallery in the manner shown at *ac* (*fig. 8*). If the excavation is carried from the surface of the earth to the depth designed for the bottom of the gallery, this is called working the gallery above ground (*pl. 51, figs. 1, 2, 3*). Then strong beams, *a* (*fig. 1*), are laid across the space, and sunk in the ground, so that they extend on each side three feet beyond the side of the gallery, the breadth of which is determined by the beams, *b*, laid upon these. These squares being dug out four feet deep, a new propping is formed by means of the pieces *c* and *d* (*figs. 1, 2*), which are mortised into the short pieces *e* (*fig. 2*), at five feet distance from each other, boards having first been driven in behind *b* and *e*. The strips, *h*, keep the pieces at the same distance. *Fig. 3* shows the cross-section of the gallery. The excavation being completed, the frame for a wooden gallery is set up, or a gallery is built of mason-work. At the extremity of a mine gallery, *ab* (*fig. 11*), the chamber, *A*, is hollowed in the side wall, *bd*, so that it stands six inches from the top wall; if the gallery has a fall, *bd* must be levelled. The size of the chamber is governed by that of the box, *gfcd* (*fig. 12*), which it is to contain, and which is filled through the vacant space *abfg*. The box *gfcd* is partly sunk in the floor *hi*. The saucisson, a tube one inch in diameter made of canvas filled with powder (*a, fig. 10*), lies in the wooden fuse-case, *bcd*, secured by the slings, *g*, and passes at *e* (*fig. 12*) into the powder-box, where it is fast nailed. The powder-box being filled, is tamped in the following manner. The vacant space, *A* (*fig. 14*), above the box, *B*, is filled with pieces of wood; in front of this powder-box 2-inch plank, *b*, are laid over one another to the roof, *cc*, cased with the boards, *a*, braced by the pieces, *d*, and then the vacant space filled with stone. The part of the tamping, *cccc* (*fig. 27*), being completed, the gallery along *Cc* is tamped with stone or sand-bags, strengthened every six feet by pieces of wood, *e*. When the mine is to be fired, the end of the saucisson is nailed upon a board, cut open, and set off by a piece of lighted tinder. For this purpose the box-trap (*fig. 15*) is used. Upon its slide, *A*, lies the tinder, *b*, which, when the slide is drawn out, falls and kindles the powder at *c*. If a number of fourneaux are to be fired at the same time, for instance ten fourneaux, *A* (*fig. 16*), the saucissons are laid as shown in that figure. If saucissons are led from the fourneaux only to the main gallery (*fig. 17*), at each entrance by a small gallery, a block, *A* (*figs. 17 and 18*), with a ring, *x*, and at the turn of the gallery, the block *B* (*figs. 17 and 19*), with the roller *y*, are fixed, and then a cord, soaked in linseed oil, led through the rings and over the roller; by means of this cord the slides of all the box-traps in *fig. 16* can be drawn at once. The charge of a mine is regulated according to the effect desired from it. When a mine, *a* (*pl. 51, fig. 20*), is fired in firm ground, it first lifts the earth above it in a gentle hill (*fig. 33*); this hill being raised so far that its boundary extends to the margin of the crater of explosion, *hhhh* (*fig. 20*), flame and smoke break out, and then follows the explosion; a part of the earth is

thrown towards X, the other is pressed into the side walls, *h*. The line *ao* is called the line of least resistance, *gckcg* is the sphere of action, and *hh* the crater of the mine, of which the upper surface is called the surface of explosion, its circumference the circle of rupture, the lines *oh* radii of the crater, and the lines *ha* radii of explosion. The sphere of action extends to *m* and *n*, where the earth is loosened. Towards *g* the effect is less.

In a properly loaded mine (*fig. 20*), the radius, *oh*, of the surface of explosion is equal to the line of least resistance, *ao*. If a gallery, *mn* (*fig. 25*), lies $1\frac{3}{4}$ times the line of least resistance from a properly loaded mine, it is sufficient, to avoid any impression, that it be removed to double that line by propping it with wood. If the diameter of the circle of explosion is greater than twice the line of least resistance, the mine is said to be overcharged; if less, it is undercharged. If the craters of two mines, *cdfg* and *hgik* (*fig. 22*), overlap, they must, if they do not lie so near that their spheres of activity, *trs*, pass into each other, receive a stronger charge to produce the ordinary crater. *Fig. 23* shows four mines whose circles of explosion overlap. Fougasses are made by digging pits from eight to ten feet deep, and placing in them well pitched wooden boxes, loaded with powder, bombs, and grenades, and provided with saucissons. These mines, A (*fig. 28*), are used against the saps along the capitals; the fougasses, B, are to destroy part of the crowning of the covered-way; the mines, C, are directed against the lodgment in the re-entering place-of-arms; the mines, D, defend the foot of the breach; the mines, E, are to destroy the hostile lodgments in the interior of bastion or ravelin. When time is lacking, fougasses can be established as at F, and are then called rosaries. Where saucissons cross each other, as at *m*, they are laid one under the other, being sunk at *m* and brought up again by other shafts at *n* and *p*. *Fig. 31* shows the effect of a mine in solid mason-work; *fig. 32*, upon a vault; *fig. 34*, as globe of compression against a gallery.

2. SUBTERRANEAN WARFARE.

As the approaches of the assailants are made usually only along the capitals, the gallery *mp* (*fig. 13*), running forward from the foot of the counterscarp, is the only one established at first; it is regarded as a listening gallery, but fourneaux are placed in it also. Subsequently small galleries, *ab* and *cd*, are run across through this; finally, for the purpose of blowing up the breach and counter-batteries, the crosses *eff* and the galleries *mlnm* are established, from which the new crosses, *egg* and *ehh*, can be thrown out. The gallery *mlnm* is called the magistral gallery. Frequently, also, several rows of mines are established, one above the other (*pl. 51, fig. 26*), D E F, so as to explode them in succession. In order to extend the circle of efficiency of the counter-mines further than, from want of air, it can be carried by the listening galleries, the gallery CCCC (*fig. 29*) is constructed, parallel with the magistral gallery GGGG, and called the enveloping gallery. From this the enemy's fourth parallel is blown into the air.

The two are connected by the galleries DD. Still another enveloping gallery may be thrown forward. The listening galleries, HH, run further out into the country, and from them are thrown out, according to circumstances, the fourneaux, *abc*. The gallery of communication, E, along the capital, is called the capital-gallery. *Fig. 30* shows a complete system of mines for a front of attack.

3. PONTOON SERVICE.

The object of pontoon service is to effect the passage of armies over rivers. As the building of bridges upon trestles and piles is generally understood, we shall occupy ourselves here only with the construction of bridges of boats, or pontoon bridges. The boats or pontoons are made either of copper or iron plate, or of wood sheathed with iron. A pontoon (*figs. 44–49*) consists of the body, BC, the stem, AB, and the stern, CD, and is 30 feet long, 5 feet 9 inches wide above and 3 feet 8 inches below in the centre, sharpened to both ends. The height is in the middle 2 feet 6 inches, at the stem 3 feet, and at the stern 2 feet 10 inches. E is the floor, F, the two sides; *a* are the flooring-boards, *b*, the side-boards. Small pieces, *ddefghik*, serve to hold the pontoon together, and it is provided also with the requisite iron platings. *Fig. 44* shows the side view; *fig. 45*, the upper view; *fig. 46*, the longitudinal section; *fig. 47*, the front view; *fig. 48*, the cross-section, and *fig. 49*, the rear view of a wooden pontoon whose weight is 16 cwt. The pontoneer implements for the service of the pontoon are: the pontoon kedge (*fig. 35*), a three-fluked anchor, usually four feet long; the steering-oar (*fig. 37*), with a sixteen feet long handle, *a*, the blade, *b*, and, when the rudder rests upon the wale, the reinforcement, *a* (*fig. 36*); the pulling-oar (*fig. 38*) is only ten feet long, in other respects like the steering-oar, save that the blade, *b*, is rounded; the paddle (*fig. 39*) is only five feet long, and the handle, *a*, and blade, *b*, are in one piece; at one end is the crutch, *c*, and at the other the iron mounting, *d*; the boat hooks (*figs. 40 and 41*) serve to hold the pontoon fast to any object.

To throw a pontoon bridge, the first step is to lay the ground sills, whose upper surface must lie one foot seven inches above the level of the water. Then the first pontoon on each side is placed in the proper direction, and the five bridge-sleepers are laid upon these and the ground sills, when the pontoon is again exactly aligned and firmly anchored. Then the chesses are stretched, but not so far as to interfere with the laying of the second set of sleepers. The two next pontoons are then properly placed, the sleepers laid, and so on until the bridge is completed. The pontoons are attached to each other by cross-ropes. *Fig. 52* shows the upper view of a pontoon bridge, with the ordinary span, and *fig. 53*, one with a greater span, for rivers having little current, or where but light weights are to be passed over. In the bridge with the greater space, the string-pieces rest only on three gun-wales in two pontoons. To effect this, a scaffold (*fig. 51*) of five cross-beams, *a*, the same thickness as the string-pieces, and 6 feet 6 inches long, and two

tie-beams from 5 to 6 inches thick, is laid over the pontoon, and the bridge sleepers are laid only upon this scaffold. If the bridge with ordinary span is to remain standing for some time, then in each pontoon a trestle, A (*fig. 50*), is placed, of which the cross-piece stands three inches higher than the gunwale of the pontoon, so that the string-pieces rest upon the trestles.

Fig. 42 shows a movable foot bridge. Each trestle consists of two feet, F (*fig. 43* shows their ground plan), with four cross sleepers, *a*, four struts, *b*, and four posts, *c*. To place the head, *d*, upon which the bridge floor rests, at any required height, the posts, *c*, are bored with holes at every foot, to receive iron bolts, which pass also through iron plating on the ends of the heads. The string-pieces of the foot bridge are seventeen feet long by five or six inches through; the planks are seventeen feet long, six inches broad, and two and a half inches thick.

NAVAL SCIENCES.

PLATES VI. 1—32.

I. HISTORY OF NAVIGATION.

NAVIGATION, or the art of crossing water, is so old that we know not who was its inventor. We find its application in the mythical ages. It is made use of by the poets, and every nation claims the invention of it as its own. The Greeks ascribed it to their Minerva; the Romans, to Neptune; the Chinese, to Hoang-Ti; while, in fact, it is the social impulse of man, his necessity, his desire of gain, to which we owe the art that brings together the most distant parts of the world. In the first instance, probably, vessels were confined to rivers. It was not until a later period that coasting voyages were attempted on the sea with rafts, which are now used for the transportation of passengers and merchandise. The first mention of a boat is found in Sanchoniathon, where Ausos hollows out the branch of a tree with fire, and in this frail vessel commits himself to the sea.

1. NAVIGATION OF THE ANCIENTS.

The desire to carry more than one or two persons in the same boat, led to the construction of larger vessels. If we may credit Pliny and Pollux, the first vessels of this kind were made of light wicker-work, and covered with skins. The idea afterwards occurred of using bent wood instead of wicker-work, and boards fitted to each other instead of skins. The boat was first propelled by poles, and subsequently by oars (*pl. 2, fig. 16*); the rudder (*fig. 15*) was invented by Typhis, the steersman of the Argo. The oldest ships could sail in either direction, and had rudders at both ends. Sails were invented by the Samothracians. The Greeks and Pliny ascribe them to Æolus, Dædalus, and Icarus. The anchors were very unlike those of the present day. In Homer's time, large stones were sunk in the water by ropes in order to hold the ship. Anchors were invented at a later date in Ancyra, the ancient Tectosagis. They at first consisted of large wooden pipes, filled up with melted lead, and having a fluke at the lower end.

The later form of the anchor (*pl. 2, figs. 13, 14*) seems to have been the invention of Anacharsis the Scythian. Ballast was first introduced by

Diomedes at Troy. The sounding-line is mentioned in the New Testament (Acts 27) as something in common use. Every ship was under the protection of a god, with whose image it was decorated. Other emblems were used at a later period : dragons, serpents, and so forth, from which at length the ships took their name. It was an old custom to steer by the heavenly bodies, following the sun by day and the fixed stars by night. The ancients for some time had no knowledge of the pole-star, but steered by the Great Bear, which constellation in almost all oriental histories is symbolized by an animal, as among the Arabians and Persians by a bull.

1. PARTS OF SHIPS. The oldest and best known vessel of the ancients was Noah's Ark. This indicates a great progress in the art of ship-building, of which we have no previous historical accounts. The Bible describes this structure as 300 cubits in length, 50 cubits in breadth, and 30 cubits in height ; a proportion (1 : 2 :: 10 nearly) which we often find in modern ships of war.

The most ancient boats, composed of a single piece of wood, appear to have resembled those now in use on the Tigris, Euphrates, and other rivers of the East. *Pl. 2, fig. 2* is a Phœnician boat of that kind, to which we shall presently recur. In sea-going vessels, the *hull* was usually parallel with the surface of the water, the prow and stern, however, curving upwards. The hull was built on a keel, to which, as now, the curved or knee timbers were fastened. Along the side was a row of square holes, *columbares* (*fig. 17*), for the oars. The *prow* consisted of two parts : 1. A continuation of the *keel* (*pl. 1, fig. 11* ; *pl. 2, fig. 8*), which served as a cutwater. *Pl. 1, fig. 12*, shows an ancient ship, after a drawing from Herculaneum. The flag-staff is at the stern. 2. The *stem* (*rostrum, embolus*), which at first was found only in ships of war, but afterwards in merchant vessels. *Figs. 3* and *4* represent such rostra, which at first were nothing but strong beams covered in front with metallic plates, and serving the same purposes as battering rams in the military service. Afterwards the prow was constructed of planks hewn to a point, or with the metallic covering in the shape of a ram's head. Finally, two or three points were used instead of one (*figs. 9* and *14*). *Figs. 3* and *4*, and *pl. 2, fig. 18*, show only the part of the prow above water. *Pl. 1, fig. 10*, gives the most simple form. As a defence against the prows of the enemy, stout beams projected from the ship, as in *figs. 11* and *12*. The stem was usually provided with one or two openings, called the ship's eyes (*fig. 11*), through which the ropes were passed on landing. The poop was higher than the prow, and more richly adorned. In many ships there was here a kind of tent, from which the commander gave his orders to the crew (*pl. 2, figs. 4, 6, and 7*). This was sometimes placed at the prow.

Among the more ornamental parts was the *aplustre*, a piece of carved wood at the stern, usually in the form of a pendent bunch of feathers (*fig. 6*). The ship's lantern was sometimes hung on this, or a small sail, to show the direction of the wind. *Pl. 1, fig. 5*, shows the most common form of the *aplustre* ; but it was often found as in *figs. 11* and *12*. The possession of the *aplustre* decided the possession of the ship, and it was

used as the signal of victory. If an *aplustre* was placed on the prow, it generally had the shape of a swan's neck (*figs. 6 and 7*), though the form varied (*figs. 1 and 2*), and served to fasten the ropes on landing. The flag-staff was at the stern, and bore the flag inscribed with the emblems of the ship (*figs. 12 and 13*, and *pl. 2, figs. 7 and 10*).

At the prow was the *figure-head*, the symbol from which the ship took its name. This was a boar's head (*pl. 1, figs. 3 and 4*), a dog's head (*fig. 10*), or some other image. The tutelar god was usually at the stern.

The vessel was propelled by *oars* (*pl. 2, fig. 16*), which were made of tough wood, in one piece, and plated with iron. The size of the vessel was determined by their number. The rudders or steering oars were shorter, but of greater breadth (*pl. 2, fig. 15*), and fitted into holes prepared for them in the sides of the ship (*pl. 1, figs. 11 and 12, pl. 2, fig. 7*). Sometimes the rudder was worked on the side (*figs. 6 and 11*). A handle (*ansa*) was generally attached to the upper end (*pl. 1, figs. 11 and 12*). The *anchor* originally had only one fluke (*pl. 2, fig. 14^a*) attached to a heavy shank. It afterwards received the shape, *fig. 14*, and finally as in *fig. 13*, with a ring above for the cable, and one below for the buoy. The ancient anchors sometimes had three or four flukes. The *masts* of vessels were at first low, and made to lift out. There was usually but one in the middle of the ship (*figs. 1 and 9*), afterwards a second mast was rigged near the stern. The masts of war vessels were fitted up with a sort of basket containing slingers and archers (*pl. 1, figs. 13*). The *ropes* were of flax, hemp, palm-leaves, or papyrus; but the *sails* were of an inconvenient shape, and seldom more than one in a ship. They were both square and triangular, among the Romans generally triangular. At first they were constructed of rushes; afterwards they were woven, and colored black or red, as a token of mourning, victory, or the like. A second sail, usually triangular, was sometimes used at the prow, similar to the modern spritsail. The various forms and uses of the sails are shown in *pls. 1 and 2*.

The usual materials for ships were the wood of the pine and fir. The Egyptians and Phœnicians built them of cedar. Iron nails were at first used, then copper, and the seams were caulked with rushes, tow, and hemp, and payed over with wax or a compound of melted wax and rosin. The planks were put on in double thicknesses and covered with leaden plates.

2. KINDS OF SHIPS. The ancients had: 1. *Row-vessels* and *sail-vessels*. Merchantmen were usually sail-ships. Men-of-war used sails only on the voyage, but in action the ship was moved by oars. 2. *Covered* and *open* vessels. Merchantmen had no deck, and when they used oars only one row of them; but ships of war had a deck, which was also the place for action. There were, however, some ships of war without a deck, and in that case they had only one bank of oars. The decked vessels often had two or three banks of oars, and as many decks one over the other. 3. *Long* and *round* vessels. Merchantmen were usually oval, but men-of-war were always longer. The long vessels were of different burdens; the lighter kind were always open, and were used by pirates.

We come now to a point which is not yet settled among the learned,

namely, the *banks of oars* in a vessel. The old writers speak of ships with two, three, five, and even forty banks of oars, which they called *biremes*, *triremes*, *quinqueremes*, &c. The pictures in Pompeii and Herculaneum, the bas-reliefs on Trajan's pillar, and other monuments represent these banks of oars on the outside, but not the interior arrangement of a ship. But we do not know how the sides could be high enough for so many banks; nor, if this were possible, how such long oars could be managed. It would take too much time to investigate this subject thoroughly here, but we are of opinion that the banks of oars were arranged one after another like a ladder, corresponding with the representations that still remain. *Pl. 1, fig. 13*, shows a ship with three banks of oars (*trireme*). *Fig. 14*, a man-of-war with four banks (*quadrireme*). The rowers themselves were divided into three classes, upper, middle, and lower, and these sat regularly one above the other, the upper according to Thucydides receiving higher wages, because they used longer and heavier oars. An arrangement suggested by another writer is shown in *pl. 2, fig. 7*. According to this the different sets of rowers are placed at gradually ascending distances, the upper at F, the middle at G, and the lower at H.

Among the means of defence, besides the rostrum, we may enumerate: *a. The breastwork*, behind which the men protected themselves from the enemy's archers and slingers (*pl. 1, fig. 10*). *b. The tower*. This was found only on the largest ships of war, and was occupied by archers, slingers, and engines for throwing missiles (*fig. 10*). These towers were made of wood. Some ships had eight of them. When it was desired to erect them of unusual height and strength two vessels were joined together. *c. The baskets* on the masts were found only in ships of war, rarely in merchantmen. *d. The dolphin* was used by the Greeks as an offensive weapon. It consisted of a heavy, brazen dolphin; suspended on a yard and thrown from above, it would beat in the enemy's deck or sink his boats. *e. The movable ram*, similar to the military battering ram, and used against the enemy's breastwork. *f. The grappling irons* were long rods with iron hooks, used in boarding the enemy's vessel. *Pl. 2, fig. 7*, represents a Roman ship of war. A. The stern. B. The flag-staff. C. The commander's seat. D. The rudder. E. The keel. F. The upper bank of rowers. G. The middle. H. The lower. I. The prow. K. The *aplustre*. L. The simple rostrum. M. The three-pointed rostrum. N. The breastwork. O. The oar. P. The ship's eye.

Ships of war were manned partly with rowers and partly with fighting men. A *quinquereme* carried 120 fighting men and 300 rowers, of whom the last were generally slaves. They had no special places for sleeping, but lay in the open air, the rowers on their benches. The commanders shared all the hardships of the crew. The dress was a light tunic, and afterwards a woollen overcoat. The manœuvres of the ship were performed by the rowers, after the measure of a song, or the music of the flute and harp. Merchant ships always sailed in company, partly to guard against storms, partly against pirates. A well built ship sailed about one hundred miles in the twenty-four hours. Shipwrecks were so common that

almost every third vessel was lost. Pilotage was in use among the Romans.

A large sum was expended by some of the ancient rulers for the building of *show ships*. Thus a ship was constructed by the orders of Hiero of Syracuse (264 B. C.) with flower gardens, canals, eight large towers, and an engine for throwing stones of 300 pounds' weight and arrows twelve yards long. Archimedes was required to exert all his mechanical skill to float this vessel. *Pl. 1, fig. 8*, gives a representation of this ship, which was sent by Hiero to King Ptolemy II., as it was too large for every harbor but Alexandria. Ptolemy IV. had two ships built in the roads of Alexandria, one of which was 560 feet long, 76 feet broad, 96 feet high at the stem, and 112 at the stern. This ship was guided by four oars 60 feet in length. The upper bank of oars was 76 feet long, with melted lead in the handles as a counterpoise. Four thousand rowers were required to propel this vessel, which carried in addition 400 sailors and 2850 fighting men. *Pl. 2, fig. 11*, represents this ship. The other ship was 590 feet in length, 60 feet in breadth, and 80 in height, containing numerous sleeping rooms and banqueting halls, magnificently adorned with gold and ivory. A double gallery was extended along the outside. The show ship in which Queen Cleopatra (30 B. C.) visited Antony in Cilicia (*pl. 2, fig. 10*), had a gilded stern, oars inlaid with silver, and sails woven with purple. Delicious music accompanied the stroke of the oars, and a band of beautiful maidens clad as Graces stood at the rudder and managed the ropes. Cleopatra herself reposed on a splendid couch beneath a golden canopy, while she was fanned by boys who personated Cupid.

3. MARINE AFFAIRS OF DIFFERENT NATIONS. *a. The Phœnicians.* This nation, which first inhabited ancient Palestine, then the coasts of the Red Sea, and finally settled on the eastern coast of the Mediterranean, was the first that we find spoken of as addicted to navigation. About the year of the world 2560 the Phœnicians had colonies on almost all the islands of the Greek Archipelago, and 1250 years before Christ they made the first attempt to pass through the Straits of Gibraltar. Soon after they had colonies on the west coast of Spain, and it was the Phœnicians who changed the original coast navigation into the actual navigation of the sea, steering their course by the stars. Their polar star was not the same as that of the present day, according to Flamsteed and Bode being the star β in the shoulder of the Little Bear.

The Phœnician ships of war were sharp pointed at both ends, and moved by from 20 to 60 rowers. They were attended on their voyages by several transports. In general they bore the name of Argos. They had several banks of oars, sometimes amounting to twenty. The merchant vessels were round, the smallest of them being of very simple construction (*fig. 2*). Afterwards when their size was increased and they were used as transports they were made longer and more rounded at the ends (*pl. 1, fig. 1*). These were called *liburnæ* or three-oared *gauli*. The increased size of the vessels and the use of sails soon introduced an improved mode of ship-building, and the merchantmen took the form as in *pl. 1, fig. 2*. They

were manned with from 12 to 24 sailors, and a suitable number of rowers. The sails were not used to the best advantage, for the art of trimming them to a side wind was not yet known. The voyages were accordingly very tedious when they did not fall in the time of the trade winds. In the days of King Solomon the Phœnicians were known as the most important seafaring people, and no great maritime enterprise was undertaken without their aid. The rowers were seated in a large inclosure on the sides of the ship, from 15 to 20 on each side. This had the appearance of floating on the water. The masts were made to lift out; the sails were strengthened with rushes and the bark of trees; but the rigging was in the highest degree imperfect.

With the founding of Carthage (890 B. C.) the decline of Tyre commenced. This had been the principal state of the Phœnicians. The Carthaginians paid great attention to the improvement of navigation, and their fleet for the invasion of Sicily consisted of two hundred men-of-war and one thousand transports.

b. The Egyptians. Egypt, although the cradle of the arts and sciences, was at first far behind the Phœnicians in respect to navigation. This was, in part, owing to the religious ideas of the inhabitants. They had such a hatred of the sea, that the priests did not eat either salt or fish; and as a portion of the people were engaged in navigation, they were considered as a degraded caste. Another cause of the neglect of navigation was the want of ship-timber. The first navigation of the Egyptians was accordingly confined to rivers. They used only vessels made of the wood of the acanthus and tamarisk. Herodotus gives us the first account of Egyptian boats. They had a rudder at the stern, a mast of acanthus wood, and sails of papyrus (*pl. 2, fig. 1*). These Nile boats were in use in the time of the Romans. Some were made of wicker-work, covered with skins, and abound with painting and other embellishments. The importance of the river navigation may be inferred from the fact that the granite block which covered the altar in the temple of Latona, at Butus, measuring 240 cubic feet, was transported by water. The antipathy of the people to the sea was first overcome by Sesostris. He constructed a fleet of four hundred sail for the purpose of conquest; from that time the art of navigation made great progress in Egypt. Although the Egyptians in 1856 B. C. led a colony to Greece under Inachus in Phœnician vessels, in 1582 B. C. Cecrops sailed to Greece in Egyptian vessels, and there established the fortress Cecropia, afterwards Athens. The largest Egyptian ship of that day was built by the Phœnicians; this was a transport of fifty oars, which, 1475 B. C., brought Danaus to the coasts of Argolis, where he founded a colony. During the reign of Ptolemy, after the death of Alexander, who had delivered Egypt from the Persian dominion, a new era commenced for Egyptian navigation. The first enterprise of this kind undertaken by Ptolemy Lagus was the enlargement of the harbor of Alexandria, by connecting the island of Pharos with the main land by a dike. Here he placed the first light-house, as a beacon for ships; this stood on the eastern point of the island, and was completed by Ptolemy Philadelphus: it consisted of four stories; it was built of white marble, and

was surrounded with galleries resting on pillars; the total height of this building was four hundred feet; the lower story formed a square, of which each side was over one thousand feet in breadth. *Pl. 2, fig. 19*, gives a view of the light-house, and *figs. 19^a, 19^b*, show the ground plan of the different stories. Under the Ptolemies, also, the two large ships of which we have already spoken, were built. But however great the eminence which Egypt at first attained under this dynasty, it afterwards sank to an equally low depth; and when under Ptolemy XII., Julius Cæsar burned an Egyptian fleet of 110 sail, on the open sea, and sacked Alexandria and Cairo, the Egyptian marine, which had flourished for two thousand years, was left almost without a trace on the records of history.

c. The Greeks. The Phœnicians, whose navigation was more than four hundred years old at that time, brought a colony to Greece under Inachus in the year 1856 B. C.; but when, three hundred years later, the colony under Cecrops arrived thither, the people were found in a savage state, living in caves, and suffering under the yoke of the pirates. The first thing necessary, therefore, was to establish navigation, in order to act against these enemies. Connected with this were certain relations of trade, which was still in such a rude condition that as late as seven hundred years after Abraham only barter was known in Greece. The inhabitants on the southwest coast of Attica were the first who engaged in navigation, and the most ancient voyage authenticated by history was the Argonautic expedition to Colchis, for which Jason, probably 1200 B. C., constructed a vessel of a much larger size than had hitherto been known in Greece. After the Argonautic expedition, the Greeks engaged more extensively in navigation. In eighty years the siege of Troy took place, with a fleet of 1,186 ships; the largest carrying 120, and the smallest 50 men. The first ships of the Greeks seem to have had no keels; Homer makes no allusion to any, and all the Greek vessels of that age were large barques, with a single bank of oars, as shown in *pl. 2, fig. 3*. They were usually round, and the stem and stern were so elevated that the ship almost looked like the moon in the last quarter; afterwards the stern only was raised so high (*fig. 4*). The Plateans introduced the use of two steering-oars. The oldest vessels, which were entirely open, were called *aphracti*; the round half-decked ships were called *kataphracti*. They had willow guards at the side to break the force of the waves; only one mast was used, which could be taken out at pleasure; the mast bore one or more sails, which were moved by ropes. These at first were made of bark, but afterwards of skins; four such ropes at the prow and the stern held the mast. The ships were often painted in encaustic with lively colors, which helped to preserve them.

The Greek trading vessels had a wide bottom; their length was only three times their breadth, while the ships of war, on the contrary, were long and pointed, with usually not more than twenty rowers on a bench, the Greeks being skilful in the use of sails on the high seas. The ships were drawn ashore to winter, and were often conveyed considerable distances by land. The merchantmen generally had two banks of oars; some had two banks at the stern, and only one at the prow, the prow being made narrower on

that account. In the time of the Apostles very long vessels were in use, with two decks at the stern; there was also a midship-deck, with a room for offering sacrifices. At the end of the bowsprit, in the forward part of the ship, was a short mast with a sail, behind which ran a small gallery, from which the orders were given to the crew. The Greek ships were adapted for sails as well as oars; they were usually triremes, as in *fig. 6*, although there were sail-vessels with one bank of oars (*fig. 4*). These galliots were afterwards less curved, longer, and with two banks of oars (*fig. 5*).

The first ships were no doubt constructed without keel-beams, but these were used at a later period. The ship's bottom was fastened to the beam on both sides with strong planks; this was the place for the ballast; next to this was the hold, which was divided off by the timber knees attached to the keel. The oar benches were on each side, the oars passing through openings in the ship; above the oar-benches was a gallery for passengers. The prow, the stern, and the sides were often richly ornamented with carved work; the stern was rounder than the prow, was built higher, and was fitted up with an arched canopy, under which sat the steersman. The steering-oar was at the stern; the larger class of ships had two, which passed out of a kind of square box at the sides, in which was a round hole. Rudders similar to those now in use were not known until a later period. The mainsail was attached to the mast; a sail at the stern often served to increase the speed, and a smaller one was sometimes raised at the prow; a topsail was in use at the time of the Apostles. If the vessel had more than one mast, the mainmast was amidships. Besides the usual ships of war, the Greeks had vessels for transporting horses, and others for reconnoitring, whose breadth was only one ninth of their length; these carried few men, but were of great speed. There were boats of different sizes, which communicated between the vessels of a fleet. The largest Greek ship was that which the city of Heraclea sent to the aid of King Ptolemy Ceraunos; this had 800 oars and 1,200 marines.

d. The Romans. The Romans were confined for a long time to a rude coasting navigation, which scarcely extended beyond the neighboring island of Sicily; even their first larger voyages were performed in hired vessels, until after the first Punic war. At that time they suddenly resolved to create a fleet of their own, and they accomplished this with incredible rapidity: within two months they built a fleet of 120 vessels, with which Caius Duilius risked an engagement, and came off victorious. This victory was celebrated by the erection of a monumental column in the forum at Rome (*pl. 2, fig. 25*), which was ornamented with the beaks of the conquered vessels. Similar monuments succeeded this *columna rostrata*, which was erected A. U. C. 494, although the Romans obtained no other victory so signal.

The Roman ships must evidently have been built on the Greek and Phœnician models. The merchantmen were mostly sailing vessels; the ships of war had both sails and oars: and we again meet with the Greek biremes, triremes, and so forth. The largest and most usual men-of-war were quinqueremes, but there were also light vessels with a bank on each side, which

were often employed for reconnoitring; smaller vessels, called *cymbæ*, were used for quick transportation. The vessels of war were manned with rowers and marines, Roman citizens of the lower class. A quinquereme counted four hundred rowers. The sea-captain directed the affairs of the ship, but the soldiers had their own commander. The admiral's ship was designated in the day by a flag, and in the night by lanterns. *Pl. 1, figs. 11 and 12*, represent smaller Roman triremes, as they are found on the bas-relief of Trajan's pillar. *Fig. 13* is a large trireme, *fig. 14*, a quadrireme. The principal difference between the ships of the Romans and those of the Greeks and Phœnicians consisted in the greater length of the former, which admitted two masts in the larger vessels. The masts were usually provided with baskets, containing slingers and archers.

Before leaving the subject of ancient navigation, we must briefly describe the method of naval warfare, and of manœuvring ships at sea. The crew were summoned on board by a signal from the trumpet. First came the rowers, and then the marines; the crew of the transports came last. Before sailing, sacrifices were offered, and also after returning from the voyage. During an engagement, no use was made of the sails, and the ship was moved only by the oars. In the order of battle, the largest ships took the centre, the light ships took the wings, and others formed a reserve. The ships were generally drawn up in the form of a half-moon, but sometimes in that of a wedge or circle. The admiral sailed through the fleet in a light vessel, exhorting the men to courage. The sails were then furled, and everything made ready for action, for which the signal was given by a red flag from the admiral's ship. The signal for attack was then sounded on the trumpet, the ships were driven against each other, the slingers and archers took deadly aim at the crew of the enemy, and the rowers endeavored to destroy the opposing vessels with the beaks of their own. If this did not succeed, grappling irons were thrown out, the vessels were drawn together, and the action became a personal conflict. It was often attempted to fire the enemy's ships, either by fire-ships or by throwing earthen vessels filled with burning pitch and sulphur. *Pl. 1, fig. 16*, represents a sea fight. The victorious ships returned home, adorned with flowers and laurels.

The warlike spirit of the Romans was cherished in their games and amusements. Sea fights were exhibited in time of peace, and were called *Naumachia*. These were introduced by Julius Cæsar. The circus was so arranged by Maximus that it could be filled with water to a considerable depth. Ships were built on the arena, the water let in, and a regular battle fought by slaves and prisoners, by whom the vessels were manned. These mock engagements often resulted in dreadful slaughter on both sides. At a later period, they were fought on the larger lakes, or artificial lakes were prepared for their representation. An amphitheatre for this purpose was erected by Domitian, of which *pl. 2, fig. 12*, gives a sketch. This structure was elliptical, 1300 feet long, 200 feet broad, and had room for the manœuvres of 30 triremes and a great number of smaller vessels. The avenues to the building were richly ornamented; the arena was placed under water

by means of subterranean canals, so that it could be quickly dried for the exhibition of the gladiatorial contests. The last spectacle of this kind was given by Aurelian in honor of the victory over Queen Zenobia.

2. NAVIGATION OF THE MIDDLE AGES.

During the period which we call the Middle Ages, that is, from the fall of the Western Empire and the succeeding centuries, the results of navigation were very insignificant, since it shared in the general depression of science and art at that time. The most important naval enterprise was the expedition of Belisarius against the Vandals in 533, with a fleet of 500 sail, 15,000 warriors, and 20,000 sailors. Triremes had then gone out of use, and there was no convoy for the army but 92 light brigantines, which could not resist a serious attack.

1 ANGLO-SAXONS, NORMANS, AND ENGLISH. Meantime, the northern nations of Europe appear on the theatre of history, and the first maritime expedition of which we have any account was the voyage of the Anglo-Saxons to Britain under Hengist and Horsa, A.D. 449. This was performed in light, frail vessels, with keels of light timber, and sides of wicker-work, laid over with skins. The vessels in which the Normans undertook their piratical expeditions in the seventh century were of little better construction. The Grecian and Imperial navy at that time consisted of galleys with two banks of twenty-five oars on each side, making one hundred oars in the whole.

From the ninth century, England was the most important maritime nation. Alfred the Great, who was in conflict with the Normans and Danes, effected such great improvements in her navigation, that in the year 897 her ships were without an equal in any nation. They were built as galleys, with from forty to sixty rowers on each side, while William of Normandy, in his expedition against England in 1066, which, after the battle of Hastings, gave him the name of Conqueror, used only vessels (*pl. 1, fig. 15*) of such diminutive size, that they could carry no more than twenty armed men besides the rowers.

A great impulse was given to navigation in the middle ages by the crusades, and the frequent wars of the English, French, and Spanish. In the battle of Sluys, 1339, the French fleet consisted of 400 vessels, among which were 120 large ships. The number of men who fell in this battle is variously stated from 10,000 to 30,000, from which we may infer the magnitude of the ships engaged. The construction of vessels at that period is shown from the remains of tapestry, and from pictures in ancient manuscripts. The English ships were not so long as those of the Normans. The stem and stern were quite sharp, beak-like, and of equal height. They were ornamented with dragons' heads, and the stern often had two projections in the shape of wings. The steering oar was managed at the side. The mast was amidships, and the rowers worked standing. The anchor was very large, with a stock. The Norman vessels were sharper and higher

in the prow than in the stern. The steering oar was of the Greek fashion, with a handle. The mast stood more towards the prow, and bore sails and a flag with the Norman arms. The war barques from the year 1377 were almost round, with a regular keel. They had a kind of wall or breastwork fore and aft, the sails were stitched, and the mast, stayed by a rope, stood amidships. A war ship of the same time was high in the sides, rather short and round, with a quarter-deck forward; a rudder, similar to the modern rudder, at the stern; the mast with shrouds and a basket. The galleys had a similar construction, but were less round forward; they had no mast, but houses on each side for the rowers. At the stern was a kind of tent. The war ships had seldom more than one mast. This consisted of a single piece; the square sails were attached above to a yard, which, when the sail was not used, was let down to the deck. The planks of the ships lapped over each other like a weather-boarding, and were not caulked.

Under Henry VIII. of England, navigation assumed a new form, and during his reign (1485–1509) the permanent English marine was founded. We have representations of the ships constructed at that time. They carried cannon, for which Deschanges of Brest invented port-holes in the year 1500. One of these vessels was called *The Harry Grace à Dieu*, or *The Great Harry* (*pl. 4, fig. 2*). The quarter-deck, which we have already mentioned, here formed a regular deck and forecastle, bearing two batteries, one over the other, the lower consisting of 5-pounders, the upper of 4-pounders and 2-pounders. The lower side batteries had culverins (18-pounders), and the upper, demi-culverins (9-pounders). All had port-holes, but the guns in the forecastle were discharged from round ship's-eyes, and had no side bearing. Aft, near the rudder, were 24-pounders or 32-pounders, to fire on the enemy during a retreat. The ship had four masts, or with the bowsprit, five, all of which were in one piece; they had two baskets and double topsails. The rigging was very simple. The ship was of 1000 tons burden, and carried 120 cannon. The carac built by Francis I. was of the same magnitude, and had 100 cannon. The *Sovereign of the Seas*, built by James I. (*pl. 3, fig. 4*), shows the first artificial lengthening of the mast by the addition of a topmast. This vessel was 128 feet long, 48 feet broad, and carried 106 heavy cannon. The construction of this ship resembles that of the present day; the misshapen high castles have disappeared, although the sharp projection of the prow reminds us of the beak of the ancient ships; the sails have increased in number; the rigging is more artificial; and the position of the masts is favorable to rapid and secure sailing. The sail under the bowsprit is worthy of notice. This was first used on *The Harry Grace à Dieu*, and was the origin of the present jib.

2. SPANIARDS AND PORTUGUESE. The Spanish marine was of a good deal of consequence at that time. The Spaniards built for their great voyages of discovery a number of galleys, with six or seven decks, and from 1800 to 2000 tons burden. The Portuguese built for the East India trade large galleys called caracs (*pl. 4, fig. 1*) which were moved by sails and oars, and instead of a rudder at the stern had two large oars with

broad blades. The rowers sat on cross-pieces, looking to the outside, sometimes with a row of twelve men on each side. The great Spanish Armada, which sailed to England under the Duke of Medina Sidonia in 1588, consisted principally of ships of war, as represented in *pl. 3, fig. 3*, few of which carried over 30 guns, and which were for the most part moved both by sails and oars. The number of regular ships of war was 24; there was one large galley from Naples, and four Portuguese galleys, which were manned with 2088 galley slaves for the oars and 900 marines. In addition to these two fleets, the Armada had eight separate squadrons, amounting in the whole to 59,120 tons burden, and carrying 2765 guns. They were manned with 7865 sailors and 20,671 marines, while the English fleet was composed of only 181 vessels, of which only 34 could be regarded as ships of war, the remainder having no vessel over 200 tons. The whole fleet amounted to 31,985 tons, with 17,472 men. The Spanish fleet, in which with the rest of the company were 669 monks and a number of women, set sail May 29, 1588. The admiral's ship had a castle with towers; all the masts were wound with thick ropes, to break the force of a cannon ball; and the sides of the ship were so solid that no ball could pierce through them. Of this powerful fleet, not a ship reached England. During a calm night, the English commander sent eight fire-ships into the midst of the fleet, joined battle in the morning, and in a few hours gained a decided victory. The retreating Spanish fleet became a prey to the winds and waves, so that only 53 ships succeeded in reaching Spain in a most distressed condition. The Spanish navy has never since attained so high a point. The Portuguese marine, which in the 16th and 17th centuries formed an important mercantile fleet, is now insignificant.

3. GENOESE AND VENETIANS. The naval power of the Genoese and Venetians was of great importance in the middle ages. In the year 1100 the Genoese placed ships of war at the service of King Baldwin of Jerusalem; but in the succeeding centuries the marine gradually declined, until it became wholly insignificant, when Genoa was reduced to the dominion of France and afterwards of Milan. In the ninth century Venice was in possession of the whole coasting trade of the Adriatic Sea, which it secured by a navy of considerable magnitude. In the struggle for Pope Alexander III., 30 Venetian galleys fought against 75 galleys of the Emperor Frederick, and gained the victory under the Doge Sebastiano Ziani, in 1177. From that time date the so called supremacy and marriage of the Doge with the Adriatic Sea and the famous voyage in the Bucentaur. At the end of the fourteenth century, Venice possessed a fleet of 3000 merchantmen, of which 300 were of 700 tons burden. The fleet was manned with about 25,000 sailors, protected by 45 galleys with 11,000 marines. In the fifteenth century, the naval arsenal at Venice employed 16,000 laborers, and had 36,000 seamen. A kind of vessel which came into general use at that time, and which properly forms the transition from the triremes of antiquity to the ships of modern times, was the *galley*. This was usually from 130 to 140 feet long, and from 16 to 20 broad. *Pl. 3, fig. 6*, gives a front view of this vessel. They were somewhat smaller than the galleys constructed by Badoaro

in the year 1560. In the thirteenth century, galleys were the only vessels of war employed on the Mediterranean; in the fourteenth century they were divided into three classes, and in the sixteenth century appear to have passed beyond the Mediterranean; but in the middle of the seventeenth century they went out of general use, being now employed only as coasting vessels. The galleys had twenty-five oars on each side, which were moved together by beams moving with them. The benches, on which five men sat for every oar, were built on the outside of the vessel. A passage ran through the middle of the galley, which served for the protection of the cargo and the quarters of the men, and through which the captain passed back and forth. The whole was protected from the rays of the sun by a sort of tent. Five guns usually stood on the prow (*pl. 3, fig. 2*), and on the side, several swivels and swans'-necks. At the stern (*pl. 4, fig. 3*) were the emblem and name of the galley, with the captain's state-room, and usually several six-pounders. The galleys carried two masts of moderate height with triangular sails, the largest of which was unfurled only in a light wind. There was sometimes also a small mizen-mast. The principal galley was called the *reale*; the next, the *patron* or *captain*. Small galleys of from sixteen to twenty oars were called *demi-galleys*, and those with broad sterns *bastards*. The convoys had a complete military organization, the commander holding a council of war with the captain and officers of the galleys. The most exact directions were given with regard to lading and manning the vessels. Thus, for example, the vessels of the convoy destined to Flanders must be manned with 200 free seamen, among whom were 180 rowers and 12 archers. The freight must not exceed 140 tons, 60 tons being articles of merchandise. At times of pressing danger, 30 archers were taken instead of 12. Since Venice has belonged to the Lombardo-Venetian kingdom, and with that to Austria, her marine has been absorbed in the Austrian.

4. SCANDINAVIANS AND RUSSIANS. The northern nations of Europe, especially the Scandinavians, were skilful navigators as early as the fourth century. In the sixth century we have accounts of the sea-kings (*Vikings*), who dwelt on the headlands and followed piracy. In the year 872, Ingulf and Hjørleif and several other noble Normans fled from the tyranny of King Harold Harfagger to Iceland, which was then almost uninhabited, but in 925 the population amounted to 80,000, who lived in a well organized state and gained their support partly by commerce and partly by piracy. The discovery of America has been ascribed to them by Danish antiquarians, with a show of proof found in some alleged Runic inscriptions on ancient monumental stones in Rhode Island and Connecticut, but their arguments seem to be destitute of all historical validity.

5. NETHERLANDERS. The navigation of the Netherlands was of great importance in the middle ages. Their various commercial relations demanded a large mercantile marine, together with a powerful navy for its protection. The Dutch marine, accordingly, during a part of the seventeenth century was the largest in Europe. Hence great attention was paid to the art of ship-building. In consequence the Dutch ships were of a

superior character, and some of the best specimens of naval architecture are of Dutch origin. We shall describe their peculiarities in another place. We find in the early naval registers of Holland ships of 90, 92, and 94 guns, but we are struck with their comparatively small number of men. The admiral's ship *Unie* of 94 guns had only 550 men; the rear admiral's ship *Zeeland* of 90 guns only 425 men; and the ship of the line *Westfriesland* of 88 guns only 470 men. In the war between Holland and France and between Spain and France, in which Holland lent her aid to Spain, Holland had 70 ships of the line and 30 frigates in active service. Among them were 14 ships of from 84 to 94 guns, 17 of from 68 to 76 guns, 19 of from 60 to 54 guns, the remainder with 54 guns, and the frigates with from 30 to 40 guns. In this war the Dutch admirals Van Tromp and De Ruyter gained immortal renown. A peculiar branch of the Dutch navigation was the herring fishery, for which this country in the middle ages had almost a monopoly. The Dutch first engaged in this fishery in the latter part of the 13th century, Edward III. of England having given them permission in 1295 to take herring on the English coast. Wilhelm Beukelszoon brought the art of pickling herring to perfection in 1397. In 1644, Holland equipped 1054 herring smacks. These were round both in the stem and stern; they had only one mast and one large sail, except a triangular stay-sail and another light sail on a small mizen-mast. They carried from 350 to 500 barrels of herrings. They were manned by about fifteen sailors. The Dutch also engaged in the whale fishery and fitted out voyages to Greenland. The Greenland Company, established in 1614, however, had such ill-success that they surrendered their charter in 1651.

6. THE FRENCH. France also assumed an important place among seafaring nations in the middle ages. Her marine was derived directly from the Greeks, for Massilia, now Marseilles, was a Greek colony and a powerful rival of Carthage. Marseilles was most distinguished in the time of the crusades. It was her vessels that bore the crusaders and pilgrims to Palestine. The business was reduced to a perfect system. On an average, from 6000 to 7000 pilgrims were carried annually. The master of the vessel bound himself by an oath to care for the pilgrims, whether sick or well, alive or dead. Each pilgrim was guaranteed a space for sleeping six feet wide, seven feet long, and twenty inches high. Every ship was obliged to be armed, and with a sufficient force to repel the attacks of an enemy. Another landing-place was Aigues Mortes, which, now several miles from the sea, at that time had a good harbor. For a long time navigation made little progress on the north-west coast of France. In 1513 a commercial marine of some importance was established at the port of Harfleur. *Pl. 4, fig. 4*, shows the arrangement of the oars and sails in the galleys during the reign of King Francis I. The construction of ships of war improved with the improvements of the merchant vessels, and (as shown in *pl. 3, fig. 1*) they received a more convenient, symmetrical, and elegant form. But the French navy was raised to a formidable degree of power under Colbert, the celebrated minister of Louis XIV., and at the battle of the Hague, May 31, 1692, it had a decided supremacy over the maritime force of every

other nation. At the commencement of that year, it numbered not less than 101 ships of the line, 8 of which carried from 100 to 108 guns, and all of them remarkably well manned. The *Soleil Royal* (*pl. 3, fig. 5*), of 108 guns, had 1000 men; the *Foudroyant*, of 110 guns, had 900 men; and the *Merveilleux* had 850 men. The number of frigates, bomb-ships, and so forth, corresponded with that of the ships of the line. In order to keep the fleet in constant action, Louis XIV. kept up an almost uninterrupted naval warfare with Algiers, Tunis and Tripoli, Genoa, and so forth. The harbors of Toulon and Brest were placed in the most excellent condition at a great expense, and a new harbor formed at Rochefort. Dunkirk and Havre de Grace were also at that time important naval ports. The sea-service then employed 60,000 men, but the commercial marine in 1664 numbered only 2368 vessels, of which only 19 were of from 300 to 400 tons burden. In the year 1843, France had 15,025 merchantmen, amounting to 647,107 tons. As a contrast to the *Soleil Royal*, we have represented (*fig. 7*) the ship of the line *Ocean*, carrying 108 guns, built under Louis XVI.

7. THE GERMANS. The German navy, small as it now is, held an important position in the middle ages, although the geographical situation of Germany, whose coasts are washed only by inland seas, seems to assign it only a subordinate place.

In the ninth and tenth centuries the German trade was mostly domestic, although the Rhinelanders pursued some traffic with the Scandinavians and with England. Dragawitt was a commercial port in Holstein in the year 789. Rorich was a celebrated trading city at that time on the site of the modern Rostock, and was afterwards destroyed by the Danes. Lethira, which was destroyed by Otto I., was the modern Stargard. Lübeck was built by King Wilzen Liuby, destroyed in 1139 by the Russians, and rebuilt in 1144 by Adolphus II. of Holstein-Schaumburg, at a little distance from its former location. In 830 Stettin was also a place of considerable commerce, and Vineta, on the island of Usedom, in the ninth century was one of the largest cities of Europe, maintaining mercantile relations with Greece, Asia Minor, Tartary, China, and India. The harbor could contain 300 ships. In the eleventh century the city was buried in the sea by a sinking of the earth, but in the sixteenth century the ruins of buildings and towers could be seen at low water.

German commerce received a powerful impulse at the time of the crusades, and this circumstance, together with the piracies that were committed by the inhabitants of the coast on the North Sea, exerted an important influence on the development of navigation. At that time, especially while the Emperor Henry IV. was under the Papal ban, the administration of justice had almost entirely ceased, and the cities leagued together for mutual protection. The first of these alliances was the league of the Rhenish cities, of which Cologne was the centre. This was followed by the Suabian league, which was important in relation to the navigation of the Danube and the trade with the Levant, and afterwards by the Hanseatic league, which embraced North Germany, including the territory conquered from the Vandals east of the Elbe and Oder. At first this league included

only 14 cities, but in the 14th century the number had increased to 77. After the Hanseatic league had exerted a favorable influence for a full century, its supremacy was shaken and its privileged trade with foreign countries destroyed by the increase of trade in the interior of Germany, and the growing power and industry of the States, in which it had its last depositories. Finally, even its name disappeared from history, and at this time the title of Hanseatic cities is borne only by Hamburg, Lübeck, and Bremen.

The commercial confederation of the Hanse had the natural consequence of improving the navigation of Germany. In the eleventh century a fleet sailed from Cologne to England; in 1247, 300 ships were equipped for the crusades at Cologne; and Lübeck at the close of the thirteenth century was the mistress of the Northern seas. Her fleet fought the battle of Travemünde with the Danish King Waldemar II. in 1235, which terminated in the total defeat of the Danes. The Hanse towns conquered Copenhagen four times, and in the year 1248 despatched their fleet of 280 ships, with 12,800 men, against King Erich VII. of Denmark. During the period from 1563 to 1570 they sent 19 ships to the aid of Frederick II. of Denmark against Erich XIV. of Sweden.

3. NAVIGATION OF MODERN TIMES.

We shall describe the characteristics of modern navigation in the technical portion of this work. At present, before closing our historical survey, we will give a brief view of the navies of different powers and their condition within the last few years.

THE RUSSIAN NAVY, according to recent official returns, consists of 56 ships of the line, with from 74 to 120 guns each; 48 frigates, with from 40 to 60 guns, and a proportional number of corvettes, cutters, and steamers.

THE SWEDISH NAVY is composed of 21 ships of the line, of which only ten are *in commission*; 8 frigates, 8 corvettes and cutters, 2 steamers, and 247 gunboats. The last form the guard-fleet for the harbors. Norway has only a coasting-fleet of 117 gunboats.

THE NAVAL FORCE OF GREAT BRITAIN, according to an official document presented to the United States in 1846, by Mr. Bancroft, the Secretary of the Navy, consisted of vessels *in commission*, as follows: 17 ships of the line, with 1570 guns; 32 frigates, with 1146 guns; 71 sloops, brigs, and bombs, with 856 guns; 33 schooners, cutters, tenders, and ketches, with 66 guns; 6 steam frigates, with 60 guns; 54 steam sloops, with 270 guns; 21 steam packets, with 42 guns; 9 other steamers, with 18 guns; 5 transport and troop ships, with 70 guns; 84 receiving ships, coast-guards, and other non-effective vessels, with 485 guns, making a total of 332 vessels and 4538 guns. At that time 100 vessels of war were on the stocks, intended for 3161 guns; and 204 vessels were *in ordinary*, with 9933 guns. During the Continental war, the seamen in the British service amounted to 140,000; there were 20,000 to 30,000 marines; 160 ships of the line, and 150 frigates,

but before the close of the war the force was considerably reduced. In 1815 a still further reduction was effected by Parliament; and in 1817 the number of seamen was reduced to 13,000 and of marines to 6,000. An increase was subsequently ordered, and in 1831 there were 22,000 seamen and 10,000 marines. The pay of this force, at £2 12s. a month, amounted to £1,081,000 sterling; and their support, at £1 9s. a month, cost £603,000. This added to the expense of magazines, improvements, and so forth, makes the annual sum of two million pounds sterling, without reckoning the outlay for pensions and half-pay, or for building, repairs, and construction of harbors, so that the annual charges for the navy are not less than four and a half millions. The commercial navy of England in 1843 consisted of 24,500 vessels and 160,000 seamen, with an aggregate value computed at twenty-six and a half millions sterling.

THE DUTCH NAVY consists of 15 ships of the line, of from 54 to 84 guns; 20 frigates, 21 corvettes, and 26 other vessels of war. It has in addition 13 steamships, of 7 to 8 guns each, and 165 gunboats. The colonial marine in India, in 1845, was composed of 21 vessels, including one frigate of 48 guns, and two iron steamers of 11 guns.

THE DANISH NAVY contains 6 ships of the line, with from 66 to 84 guns; 8 frigates, of from 40 to 48 guns; 4 corvettes, of from 20 to 26 guns; 1 barque, of 14 guns; 5 brigs, of 12-16 guns; 3 schooners, of 6 guns; 3 cutters, with six guns and 2 falconets; 23 bomb-sloops; 17 bomb-gunboats; 139 common gunboats, 1 steamship of 200 horse-power, with 2 sixty pound mortars and 6 24-pounders; and 1 steamship of 80 horse-power, with 2 18-pounder swivel guns.

THE GERMAN NAVY, established in 1848, as yet only contains 5 frigates, 3 of which are steamers; 6 steam corvettes; and 26 gunboats; and there is hardly any chance of its increase, or even maintenance, if the people do not realize the combination of the many small and weak German states into one single state, or a confederation with a central government, as the only executive for foreign affairs.

THE FRENCH NAVY consists of 25 ships of the line, 37 frigates, 30 corvettes, 44 brigs, 43 small armed vessels, and 32 transports. Of steam vessels, it has 1 ship of the line, with 80 guns, of 960 horse-power; 20 frigates, of from 450 to 650 horse-power; 27 corvettes, of from 220 to 450 horse-power; and 57 smaller steamers of different powers.

THE PORTUGUESE NAVY numbers 40 vessels, with 940 guns, including 2 ships of the line, with 80 guns; 6 frigates; 8 corvettes; 1 steamship, and so forth.

THE SPANISH NAVY is now greatly reduced. Of 2 ships of the line, 4 frigates, and 18 smaller vessels, which were in commission in 1834, the greater part are unfit for service, and most of the naval officers are old and worn out. The naval departments are discontinued, the General Marine Office only existing at Cadiz. In 1802 Spain had 68 ships of the line and 40 frigates.

THE SARDINIAN NAVY has 5 frigates, with 60 guns; 2 corvettes, 6 smaller vessels, 12 gunboats, and 1 steamship.

TUSCANY has a small navy of 3 schooners and 2 gunboats. The navy of the Pope consists of 2 frigates and 4 smaller vessels.

THE NEAPOLITAN NAVY numbers 12 vessels, including 1 ship of the line, with 84 guns; 3 frigates, and 4 corvettes.

THE AUSTRIAN NAVY has 8 ships of the line, 8 frigates, 4 corvettes, 6 cutters, 7 schooners, and several steamers and smaller vessels.

THE TURKISH NAVY consists of 10 ships of the line *in commission* and 5 *not in commission*; 15 frigates, 3 steamships, and several corvettes and other vessels.

THE EGYPTIAN NAVY at present has not more than 3 ships of the line, 1 frigate, 1 corvette, and 2 cutters.

THE NAVY OF THE UNITED STATES consists of 11 ships of the line, with 860 guns; 1 razee, of 54 guns; 12 first class frigates, with 528 guns; 2 second class frigates, with 72 guns; 22 sloops of war, with 418 guns; 4 brigs, with 40 guns; 5 schooners, 15 steamers, and 5 storeships and brigs.

THE BRAZILIAN NAVY has 90 vessels, including 1 ship of the line, 3 frigates, and 4 corvettes.

4. NAVIGATION OF NON-EUROPEAN NATIONS.

With the exception of the civilized portion of the American continent, navigation out of Europe is in a low degree of advancement, corresponding with the general want of culture of those nations, and the recent period at which they have come in contact with Europe. Like every branch of human knowledge, navigation has been neglected by those nations whose geographical position has isolated them from mutual intercourse with cultivated nations. A more intimate commerce with Europe is followed by the introduction of European navigation, so that a strictly national marine has no chance of existence.

Among the nations out of Europe the Asiatics and Africans have always shared to a certain degree in European cultivation, and hence the art of navigation has made some progress among them, although the influence of the European marine predominates. The only exception to this is found in China. The Chinese, a people in many respects so enigmatical and mysterious, have marked out their own path of cultivation, in which for many thousand years they have attained a degree of refinement, of which we have scarcely a conception. For an incredible period they have possessed most modern inventions, but the Chinese wall which has concealed from us their progress, has also until within a few years shut them out from European civilization, so that they have remained in the same position which they have occupied for centuries. But the extensive marine of China is so far behind the European, that the Chinese junk *Kay-Ying*, which was lately purchased by the English and taken to London, was the first ship which had ever ventured beyond the track of their wide coasting navigation, a Chinese voyage round the Cape of Good Hope being an extraordinary occurrence.

1. AFRICA. Until the seventh century this portion of the world was almost wholly unknown, and as regards the principal part of its interior is still in the same condition. The first descriptions of this interesting country are given by Herodotus. The region bordering on the Red Sea and the Persian Gulf, and the coast of the Mediterranean, has no special interest in connexion with our subject, since its navigation has become entirely absorbed in the European. We shall accordingly confine ourselves to the east and west coasts of Africa.

The fishing-boats of Mocha, in the Straits of Babelmandel, are about 24 feet long, with 16 feet in the keel, forming a long and pointed oval; the mast is scarcely 12 feet high; the sail is nearly square, and the oars are of great length, with pear-shaped paddles two feet wide. The fishing-boats in the bay of Maskate are of a very different construction. They have a flat bottom, with so slight a curve, that its outline is nearly in the form of a trapezium. They have no knee-timbers, and their planks are bent by fire, lapping over each other, and fastened to the floor with bands and clamps, forming a kind of seam. At the stern there is a rudder, reaching two feet under the bottom of the vessel, and managed with two ropes. The mast is 20 feet high, and carries a square sail on the yard. The freight boats are rounder, being five feet high in the sides, and the planks consist of several different pieces; the bottom rises pretty sharp both at stem and stern; the rudder does not pass below the bottom of the vessel, and is moved with a small bar. These boats have short knee-timbers, and are without sails. The large fishing-boats are about 45 feet in length and 14 in breadth; the bottom is somewhat curved; the frame is in the shape of a crescent, and is secured by crooked timbers fastened to the bottom of the keel; the mast stands forward; it is 36 feet high, and can be taken down; the rudder goes five feet under the keel; the sail is four-cornered, oblique, and spread to the wind by a long yard, and a sort of bowsprit which projects to a great distance; the boats have a small forward and after-deck. The smaller coasters of Maskate resemble the freight boats, except the greatest breadth is towards the stern, and the mast is 50 feet high, with a yard and an oblique four-cornered sail. This vessel has a complete deck. The larger class of coasters have an elevated side and a cabin, and a small mast besides the mainmast. There is an ornament on the prow resembling the *aplustre* of the ancients. The largest coasters of all are constructed like our smaller trading vessels, but run very obliquely forward on a short keel; the mainmast is fixed, while a second is put up only occasionally. The whole vessel is about 75 feet long, 14 feet high, and 16 feet wide in the centre. In the gulf of Cutch there are coasters not over 50 feet long, but 20 feet wide, and nearly oval in shape. They have a very high sharp keel, and rise abruptly both at stem and stern. They have a high poop-cabin, with three divisions and windows. On both sides of the gangway there is a framework three feet high, over which is drawn a covering for the protection of the cargo. The vessel is propelled both by oars and sails.

South of Maskate is the coast of Mozambique, with the island of Madagascar and the neighboring Seychelles islands. Except European vessels,

the principal craft in this quarter are pirogues ; these are very light vessels about 24 feet long and $2\frac{1}{2}$ feet wide, sharper at the stem than at the stern, and carrying some six men. The freight boats running between Madagascar and the Seychelles islands are broad, round at stem and stern, nearly in the shape of an almond, about 25 feet long, and 5 or 6 wide. They are built of the Indian teak wood, which is bent over a fire. The larger pirogues of the Seychelles and Masquerines are from 28 to 30 feet long, and 3 feet wide, resembling in appearance our fishing boats ; they have one mast, standing a little aft of the midships, with a square sail. All the vessels on the east coast of Africa are of this description ; but on the west coast, at the island of Goree, at the mouth of the Senegal, the pirogues have a peculiar construction. They are from 20 to 30 feet in length, 3 feet in breadth, and sharp at stem and stern ; the prow is higher than the stern ; the keel runs the whole length of the vessel in a moderate curve, from which segments are cut off below at both ends, forming a sort of knob ; the shape transversely is like a sack, the keel not sharply projecting, but gradually rounded. The mast stands obliquely, somewhat forward of the midships, with a wide, but short square sail.

2. ASIA. Our description of the navigation of Asia will exclude the islands of Sumatra, Java, the Celebes, Borneo, and the Philippines, since these now belong to Oceanica, the fifth division of the world.

The Asiatic navigation, in general, is far more advanced than that of the other non-European nations. This is owing to the intimate connexion which this part of the world has always sustained with Europe.

Among the vessels on the west coast of India, the coast of Malabar, the most remarkable are the *patamars*. These have a very peculiar keel, which runs into a sharp curve from the prow, and in the district of Bombay the curve even extends to the stern. But, in general, the keel goes from the stern to directly under the mast, and then takes a curve of three feet in ten, the prow sloping off in a straight line about fourteen feet in twenty-seven. The stern is oblique to the surface of the water ; the whole vessel is about seventy feet long, and the keel thirty feet. The mast stands very oblique, towards the stern, and at one fifth of the distance from the stern is a short mizen-mast. The vessel is eighteen feet in breadth at two thirds the distance from stem to stern, with a nearly flat bottom, but round in the side. They are drawn up on land so far to take in cargo, that at ebb tide they are left high and dry. The planks are notched in the direction of their thickness, and fastened with long nails driven over the seams, which are still further secured with cross-pieces.

The freight boats of Calcutta are of a similar construction, their greatest breadth being forward, with a straight bottom. The length of the straight part of the keel is only about fifteen feet less than that of the whole vessel. The bulwarks are very slender, but the interior work is of an arched form, supported by strong posts. The gangway is a kind of gallery running round the vessel at the height of two or three feet. The vessel has a main-mast and a mizen-mast, both low, and very oblique to the prow. There is

also a sort of bowsprit, which is only occasionally rigged, allowing the use of a small jib. The vessel admits of a complete deck.

The fishing boats on this coast, and northwards as far as Bombay, are sharp in the prow, round in the stern, and shaped like an almond. The larger boats carry a mast like the *patamars*. The flat boats of this district are thirty feet long, four feet broad, and three feet deep, with a curved bottom of two feet in breadth, to which the sides are attached at a sharp angle, running into a curve of sixty degrees both at stem and stern. The pirogues which are used on the rivers for the transportation of rice, are from thirty-eight to forty feet long, and only three feet broad, without keel, and nearly round in the sides. As soon as they are loaded, they are covered with an arched deck, extending the whole length of the vessel, and raised at the stern where the steersman sits like the boot of a carriage, so that he sits under cover.

In the vicinity of Goa we find *panianys*, which, with the exception of a straight keel, resemble the above-mentioned *patamars* in construction, but are of a smaller size. When they are intended to carry timber they are built on a somewhat different model, the keel being curved, and the sides rounding. The length is sixty feet, and the greatest breadth eighteen feet; the stern is finished after the European fashion; precisely at midships stands the main-mast, and a smaller mizen-mast half way between the centre and stern. A deck is carried to this mast, forming a cabin. The lines in these vessels are all curved, even in the gangways, while as a general rule straight lines prevail. The pirogues also in this district are worthy of notice. The largest are from twenty-five to thirty feet in length, fifteen in breadth, coming to a uniform point at stem and stern, forming two equal segments of a circle. Their depth does not exceed three feet; their sides form an ellipse, somewhat cut down at the upper surface, the planks being laid perpendicularly. The body of the vessel is composed of curved planks, parallel to each other, and strengthened with ribs. The oar benches are all forward. The rudder is arranged like that of our fishing boats. A square sail is attached to the mast, which stands towards the prow. The small pirogues of Goa have their side planks placed, not perpendicular, but oblique, bulging out towards the top. They are from fifteen to twenty feet long and three feet wide. In order to prevent swamping in a rough sea, they are furnished with what is called a balance frame. Two bars from fifteen to twenty feet long are placed across each side, and fastened to planks extending with their whole length over the sides of the vessel. The four ends of these bars are connected two by two with beams which lie on the surface of the water, by which the breadth of the vessel is so much increased that it cannot upset. Many pirogues have this arrangement only on the leeward side, and then the lay of the balance frame changes with the wind. These pirogues often also have a mast. *Pl. 6, fig. 10*, shows the balance frame in a small vessel, and *fig. 9*, in a larger one. We shall again return to these vessels, which more properly belong to the lagoons of Manilla.

Among the smaller vessels of Cochin-China, we may notice the *bandars*,

a kind of fishing boat thirty feet long and four feet broad, the keel running in a very flat elliptical line, and the prow and stern terminating in ornamental work, which is a characteristic of almost all the vessels of the Malabar coast. The sides are shaped somewhat like the Goa pirogues. The bandars have a rudder, and a mast of bamboo wood, at about one third of the distance from the stern to the prow. The sail is square, made of netting, stretched by a cross-piece of bamboo, and managed by a rope at the bottom.

The larger coasting vessels of this region, which are chiefly used for the transportation of teak wood, are constructed like the *panianys* and *pata-mars*, though the sides have a different shape. They have a stern castle, like the panianys, but also have a similar construction on the prow, so that the side, which is about thirty feet long, takes about four or five feet deeper water, making it more convenient to put the cargo on board. Although of considerable size, they are for the most part propelled only by oars.

In the vicinity of Travancore on the Malabar coast, there is a remarkable kind of boat called *pamban*, from thirty to sixty feet long, but only three feet broad. Their sides form a very flat curve, terminating in sharp points, which are richly ornamented with carved work. These boats are used principally in the rice trade.

Ceylon and the Coromandel coast also have their peculiar vessels. The pirogues were the first in which the system of balance frames was adopted. The most remarkable of these are the *madel-pavoacoas* and the *anjeelas* of Colombo. The former are very broad pirogues, with almost entirely flat bottoms, about four feet in width, the planks fastened with clamps and knee-timbers. The bottom, as in our vessels, rises at the stem and stern, and the boat is generally covered with a rounding deck. The *anjeela* is a double pirogue, formed of two common pirogues connected, with a space of four feet between them, covered with a deck, on which is a semicircular pavilion six or seven feet high, and from ten to twelve feet long. A large coasting vessel in this region is called the *doni*. This is from sixty to sixty-five feet in length and from nineteen to twenty feet in breadth. A vertical section forms a semi-ellipse; they have an arched deck, giving a space below nine or ten feet high in the centre. The hull is planked, with covered joints; the planks are fastened by cross-bands to the knee-timbers, and the vessel is sharper in the stern than in the stem. The keel has a peculiar shape, it being quite straight below, but meeting the bow in a sharp curve, and entering its fore part to a considerable depth. It runs back to the stern, continuing straight for some length, and after the bulge of the hull turns up in a moderate curve. The rudder is like the European. The *donis* have a balance frame, two masts, and a short bowsprit. They have wooden anchors, resembling those of the Malays (*pl. 5, fig. 11*). There are also *donis* without balance frames, which are constructed more like European vessels. (See *pl. 6, figs. 7 and 8*). The *catamaran* is a very peculiar vessel of this region, being a kind of raft for communicating between the islands and the Asiatic continent. In Ceylon they are made of three beams and in Coringui of five, which are so hewn as to be longest in the

centre when placed side by side. They are cut off blunt in the forward part, making a kind of beak of three beams, connected by joints. The beams are placed so as to form an arch underneath, the centre beam making a sort of keel. The *catamarans* are propelled by oars, a broad oar serving as rudder. They sometimes have a short mast with a triangular sail. Of the strangest construction are the Coringui boats, which are shaped like a shoe. These are entirely closed up, with the exception of a circular opening in the upper part, and rounded off forward, where they are nearly as broad as at the stern, which terminates in a blunt extremity. The bottom of these boats, which are eighteen or twenty feet long, five feet broad, and three feet deep, is almost entirely flat, the sides sloping upwards like a bell, and becoming narrower at the top. These vessels often have a mast with a square sail.

The vessels of Bengal and at the mouth of the Ganges have a peculiar construction. The smallest are the *dinghi*, equally pointed at both sides, about twenty-five feet long and six feet broad, with a cabin. The transverse section is semi-elliptical; the planks are curved, fitted to each other, and fastened with iron clamps. Of a larger size, though of a similar form, and more skilfully constructed, are the *bauleahs*, which are rounded off at the stern, and have a mast towards the prow. The cabin is covered with a flat roof; it is of considerable height, and is furnished with windows. The *dâk* or mail boats on the Ganges have a curved keel, and in the general outlines of their construction resemble the large European boats. A deck runs the whole length of the boat, with an awning to protect it from the weather. They are propelled by men who stand at the oar. The tow boats are of a similar shape, though the keel is straight, and the stern somewhat rounded off. They are also propelled by standing rowers. The *dâk* are from forty to forty-eight feet long, from twelve to fifteen feet broad, and from five to seven feet deep. The tow boats are rather larger. The *patileh* is a large transport vessel, from fifty to sixty feet long, and from fourteen to sixteen broad. The planks are fastened with wooden nails to the knee-timbers, and a row of cross-beams passes under the top plank. There is a deck, on which a platform is constructed, seven or eight feet high, where the crew perform their duties. The frame on which this platform is erected is covered with matting for about half its height, and thence a common roof of rice-straw runs under the platform. The gable ends of this building, which occupies three fourths of the length of the vessel, are closed. When the vessel is propelled by oars, the rowers either work together forward, or are distributed at the sides. If there is a mast, they are above on the platform. The rudder is in the shape of an oblique triangle, with a base of about ten feet, and four feet in height, so hung by ropes that it can be moved up and down in the water. It is not placed on the continuation of the keel, but rather on one side. The *pansways* in Calcutta and Cutwa are long vessels propelled by oars, with ten or twelve men. They have a cabin, and now and then a mast. The rudder is usually a paddle, but sometimes constructed like that of the *patileh*.

The Birman Empire has a not insignificant marine of 500 men-of-war,

which form a transition between the vessels which we have described in the Bay of Bengal, and those of European construction, although they are generally propelled by oars. Their length is from eighty to one hundred feet; they usually have eighty rowers, thirty musketeers, and a cannon. We may here notice the small vessels with which the Irrawaddy River is alive; for instance, the rice boats, forty-eight feet long and five feet broad. They have a short deck at both ends for the oars, but in the centre a tent-shaped roof of rice-straw. The pirogues in use here are forty feet long, three or three and a half feet broad, and hardly two feet deep. The stem and stern are greatly elongated, and they commonly have a cabin. The most remarkable are the *rangoon* pirogues, the transverse section of which is in the form of a slightly compressed semicircle. The sides are considerably higher at the stern than at the prow. These pirogues are constructed out of a single piece of wood, and only slightly hollowed in the centre. They are one and a half feet high, eighty feet long, and six feet broad. Seen from above, they look precisely like a fish lying on the water.

In the peninsula of Malacca, the original construction has been almost entirely superseded by the European model. *Pl. 5, fig. 12*, is a *sampan-pucatt*, at anchor and with sails. These vessels are usually propelled by oars. When it is wished occasionally to take advantage of the wind, small masts are put up in different parts of the vessel, carrying each a square sail. They are constructed almost entirely like the Bengal *bauleahs* which we have already described, though they are sometimes built with an arrangement like the *patileh*, but lower, and often merely in the form of a tent. The *pind-jejab* (*fig. 13*) are smaller vessels, of a similar construction, which have only a tent-shaped cabin at the stern. The sail is the main reliance in these vessels, the oars being used only as an additional help, and hence they have a permanent mast of bamboo, placed at about one third the length from the stem to the stern, and also a kind of bowsprit. In the Straits of Malacca, a communication is kept up with Sumatra by a kind of coasting vessel (*pl. 6, fig. 3*), which is built on a narrow keel and bottom, projecting at the sides, and running off almost square at the stem and stern. They are covered, like a tent, with matting, and are usually propelled by oars, although they have a main-mast for a sail, and a mizen-mast of nearly equal height.

As we approach the eastern coast of Asia, the vessels assume more of the adventurous form of the Chinese, and in the Gulf of Siam we find those which are very similar to the Chinese junks. We will only allude to these at present, as we shall have to speak of them again. Of a similar construction are the vessels of Cochin-China. We must here notice, however, the *gay-you*, a kind of fishing boat in the bay of Touranne. These are fifty feet long in the centre, with only a breadth of six feet, and are sharper forward than at the stern, where they rise to a great height. The section is a regular half decagon, one side of which forms the flat bottom of the vessel. The planks are fastened with wooden clamps, and hollow wooden wedges placed over the joints, overlapping each other like the European ridge-tiles, and secured with wicker-work. Beams are extended through the two opposite

topmost planks, to support the deck, and at the same time to keep the vessel in shape. The rudder passes before the stern-post through the bottom of the vessel, and can be raised up and down, as occasion requires. These vessels have from one to three masts with oblique square sails, and to keep them from upsetting, a sort of balance frame, consisting of a long boom, with a weight suspended at the end, which can be drawn out and in by a rope, and its action thus regulated. If the weight proves to be insufficient, the sailor gets upon the boom himself. The coasting vessels of Cochin-China (*pl. 6, fig. 7*) do not vary much in their construction from those now described.

We will now consider the marine of China and Japan. In respect to the form and construction of their vessels, we find that they are not adapted for long sea voyages, on which account the voyage of the junk *Kay-Ying* to London was an extraordinary event in the history of the Chinese marine. But it was this junk from which we first obtained an accurate idea of Chinese naval architecture. We find many features in the vessels of China and Japan, exactly resembling the ancient Greek construction; for instance, the ship's eyes, which are placed in every vessel of considerable size, the Chinese seriously believing that the ship sees with them, as is proved by one of their old proverbs. The freight ships are for the most part from forty-eight to fifty feet in length and ten feet in breadth, with a semicircular section, furnished with a deck and cabin, sharp at the bows, rounded at the stern, and often flat. The mast is usually from forty-five to fifty feet high, and stands about one third of the ship's length towards the prow. Near it is the windlass. The anchor itself is of iron wood; it has two arms, which are without flukes; the stock consists of a bunch of bamboo rods, and is placed near the arms. The rudder has the shape of a banner, and can be moved up and down by a windlass worked by fifteen or twenty men. All the wood-work is coarse, the timbers are seldom hewn, the Chinese regarding this as a needless expense; while on the other hand, they paint their ships with the most extravagant colors. The form and adjustment of the sails are shown in *pl. 5, figs. 3, 4, and 5*, which represent Chinese coasters under sail. The reader must not be deceived by the port-holes, and take these vessels for ships of war. The port-holes are only painted, in order to excite alarm.

The *junk* is a peculiar kind of Chinese vessel (*fig. 8*), forming a medium between merchant-men and ships of war. The first accurate knowledge of these was furnished by the junk already alluded to, called *Kay-Ying*, which made a voyage to Europe. This junk resembles in general the one represented in *fig. 8*. The flat surface of the stern, which is open, was closed in that, and painted with the figure of a large bird, like the eagle. The junk *Kay-Ying* is from 700 to 800 tons burden, 160 feet long, 33 feet broad, and 16 feet in the hold. The entire vessel is built of the best teak wood, and the planks are joined together before the insertion of the ribs. It has three masts of oak timber, the largest of which is 90 feet long in one piece. The rigging is strikingly defective. The sails are made of mats, which are run through with strong bamboo rods at the distance of every

three feet, and are hoisted by an immense rope. The mainsail is of very large dimensions, and weighs more than nine tons. It takes the whole crew two hours to unfurl it. The rudder weighs about eight tons. The anchor, which is made of bamboo and iron wood, weighs 2700 pounds. The bow and stern are of a most extraordinary height, the former being thirty feet and the latter forty-five feet above the surface of the water. It has neither keel, bowsprit, nor shrouds. There are four galleries, one above the other. As there is no keelson, the mast does not rest on the keel, but the mainmast terminates four feet from the bottom of the ship, where it is secured with ropes. The ribs, as has been stated, are not inserted until after the completion of the plank-work, which is fastened with strong spikes. As soon as the ribs were attached, two large and stout beams or braces were fastened above and below the deck with clamps, serving to hold the other beams in their place. The deck timbers are curved, and a platform is built over them, which secures them from shocks. The seams between the planks are caulked with a kind of cement, consisting of burnt and pounded oyster shells and oil, and made water-tight. The gunwale is very broad, so that the sailors can pass outside upon it; the wales project about three feet. The saloon in the interior of the ship is adorned with great magnificence, though in Chinese taste; it is thirty-two feet in length, twenty-eight feet in breadth, and fifteen and a half feet in height. The vessel is furnished with three large wooden reservoirs, each of which holds about eight thousand gallons of water.

The Chinese and Japanese ships of war, with their deficiency in rigging, and the awkwardness of the seamen in the use of sails, must evidently be propelled only by oars, as the general rule. The small size of these vessels is made up by their number. There is a countless host of such *war-penishes* as are represented in *pl. 5, fig. 2*, which are entirely propelled by oars, while that shown in *fig. 3* has all its inconvenient sails unfurled. The construction of these *penishes*, which differ considerably from the original Chinese model, shows that the Chinese were not blind to the advantages of English ship-building.

A peculiar kind of vessel is used in China and Japan, when it is required to transport light articles, which take up a good deal of room. These vessels still more nearly resemble the European construction, but on their sides are very low; they have a scaffold twelve or fourteen feet high on each side, made of stout bamboo rods, and covered with thick matting. A semicircular or saddle-shaped roof is on the top. *Pl. 6, fig. 1*, is a Macao vessel constructed on a similar plan, but with the roof supported by the side planks, and made use of only when the sailors wish to guard themselves against the weather. The Manilla coasters (*fig. 9*) give an idea of this mode of building.

Of a more original fashion are the barks or gondolas, which are used by the Chinese and Japanese in their pleasure voyages, especially during their great festivals. It is needless, however, to describe them more particularly, as a good idea of their construction can be obtained from *pl. 5, figs. 6 and 7*. Before the present regulation of trade between Europe and China, while

China was almost hermetically sealed against other nations, and Europeans only occasionally obtained entrance into the cities and islands of the empire, there were few European commercial settlements, and traders were obliged to remain in the places prescribed to them. Hence sprang up the so called factories. These were generally situated on harbors, or at least on basins where the vessels of both parties could lie at anchor and unload their cargoes. *Pl. 5, fig. 1*, represents the European factory at the Canton harbor.

3. AMERICA. Before the discovery of America by the Europeans, the navigation of the natives was almost entirely confined to rivers. The small, imperfect vessels which were originally used by the Indians have now almost entirely disappeared. The canoes which they constructed were made of large trunks of trees, hollowed out partly by stone axes and partly by fire. With their simple floats they passed up and down their streams, and often glided over waterfalls of very considerable magnitude. A specimen of their navigation may be found in the *jangadas* now in use on the coast of Pernambuco, and which often excite the astonishment of travellers. They generally consist of three trunks of trees, slightly hewn, 12 or 15 feet long, 8 or 10 inches thick, and joined together with three cross timbers. One of these has a hole to contain the mast, which carries the sail. Upon the float there is a small bench two feet high, on which the steersman sits protected from the water. A bag of manioc and a bottle of fresh water hang upon the mast. Each vessel has two or three men. If the wind bears too hard upon the vessel, the sailors cling to the opposite side so as to preserve the balance. If the vessel upsets, which very seldom happens, the men place a board underneath between two beams, which serves both as keel and to prevent leeway; they remove the masts and bench, placing both on the new platform, and thus pursue the voyage as if no accident had taken place. These *jangadas* sail closer to the wind than keel vessels, and with great rapidity, often making ten miles an hour. Nearly all the coasting trade in articles which are not damaged by getting wet is carried on by means of these vessels, and they are frequently out sixty miles in the open sea. A Newfoundland fishing-boat is shown in *pl. 15, fig. 1*.

4. OCEANICA. There now remains, in our survey of the non-European marine, the portion of the world which modern geographers include under the name Oceanica, composing the Archipelago of the great ocean between Asia and America. We shall follow the celebrated traveller and geographer Domeny de Rienzi in our division of this important portion of the world. According to him, Oceanica is divided into the following clusters of islands.

1. The country of the Malays, or West Oceanica, the so-called Indian Archipelago, with the island of Borneo in the centre.
2. North Oceanica, from the Tropic of Cancer to the fortieth degree of latitude, on the west to the island of Borodino, and on the east to 167° W. longitude.
3. Polynesia, with the West Guidin Islands, Neville, the Caroline, Pelew, and Mariner's Islands, Cocal, the Sandwich Islands, extending to the south of New Zealand; west to the island of Ticopia, and east to the island of Sala y Gomez.
4. Central Oceanica, with New Guinea, the Papuan Islands, and the islands

inhabited by blacks in the east and south-east. 5. South Oceanica, with Australia, Van Diemen's Land, New Caledonia, &c.

a. WEST OCEANICA, OR THE COUNTRY OF THE MALAYS. The close connexion which has always existed between the country of the Malays and the neighboring continent of Asia, enables us to consider the navigation of the two nations also in connexion. The vessels from the Straits of Malacca are here of interest, especially the little pirogues which are known under the name of *toucangs*. These have departed from the usual form of pirogues, being shorter and broader, sometimes having a slightly curved keel, and sometimes one entirely straight; they have square sails joined together with rice-straw, and rolled up when not in use; the rudder rests on a small platform in the stern of the boat; the oars are rhomboidal, or in the shape of a myrtle leaf. Freight ships of a larger size are propelled partly by sails and partly by oars. We have already mentioned the vessels (*pl. 6, fig. 3*) which form the principal communication between Sumatra and the Malacca peninsula; to this class also belong the large coasters of the Maldives (*pl. 5, fig. 9*), which, in their construction and the arrangement of the masts, resemble the European cutters. At Sumatra we find a peculiar kind of pirogue, called *pulo-rajahs*, which are 28 feet long, 5 feet broad, and hewn out from one piece, in the shape of a trough, their sides being raised through nearly their whole length by wicker-work, the upper part of which is kept in its place by beams; the oars are hung on small trestles, and the rudder works in a singularly shaped box at the side of the stern. These pirogues have a mast with a straight square sail. The *proas* of Achem in Sumatra are coasters which can also be equipped for longer voyages. They lie deep in the water, and their section forms a perpendicular semi-ellipse. They are 45 feet long and 9 feet broad, with three masts, of which the two after masts stand very near the stern. A sort of bowsprit is held in its place by three ropes, on which a jib is rigged; the keel forms a very long semi-ellipse; the vessel is blunt in the stern, and has a rudder on each side; it is provided with a convenient deck, and is nine or ten feet deep in the hold; the masts stand on supports of a peculiar arrangement; the sides are sometimes raised with trellis-work two or three feet high through their whole length; the rigging is more ample than in Asiatic vessels generally.

The Java pirogues are long and slender to an extraordinary degree, consisting of hollow trunks of trees, and their outline forming the larger segment of a perpendicular ellipse. They usually have two masts with triangular sails, and always double balance frames; the rudder is supported at the stern on a trestle. One of the Java coasters is represented on *pl. 6, fig. 6*, which shows the difference of these vessels from our own in the form of the keel and the arrangement of the masts. The rudder is here, as in almost all Malay vessels, set at the side of the stern-post, and is simply a very long oar. The construction of the Malay vessels, and the arrangement of their sides and deck, are shown in *pl. 5, fig. 10*, which represents a coaster drawn up on the land; *fig. 11* is a Malay anchor. These anchors are of oak; instead of the stock in use with us they have a bundle of bamboo rods, placed, however, on the arms; still European anchors are often used. The vessel

in *fig. 10* is called a *kuguar*. It carries three masts, with a straight square sail, and a bowsprit with a jib. The masts are all in one piece. The freight ships in the roads of Sourabaya are very long, slender, and shallow; their transverse section is almost semicircular; they are moved partly by standing rowers and partly by large oblique square sails on very low masts. The long rudder is fixed at the side of the stern-post. The deck is covered with a projecting roof of rice-straw. The *prao-pend-jalengs* are a kind of small freight boat, one of which is represented as drawn ashore (*pl. 5, fig. 14*). These boats have a peculiar arrangement for stretching their triangular sail.

In the Archipelago of the Moluccas, formed by the Banda and Gilolo groups of islands, the coasting vessels of Amboyna (*pl. 6, fig. 5*) possess an uncommon interest, as they combine the nautical construction of the Malay vessels with an arrangement of the masts and rigging very similar to the European. A sort of platform is erected above deck, forming a second deck, under which the cargo and crew find a good shelter. There are also the coasting vessels represented in *fig. 4*, which have a sort of cabin on the regular Malay frame, while the forward part of the vessel is protected from the rays of the sun by a tent-like awning. The only mast stands near the stern.

The Manado *caracores*, on the island of Celebes, are a kind of row-boat, used for the transportation of goods. On the sides of the boat, which has a curved elliptical keel with very high ends, there are long beams supporting galleries on their forward end, which is provided with holes, like the *columbaria* of the ancient ships. The rowers are seated on this structure, with their oars passing through the holes. The galleries are narrower forward than aft. The vessel itself is covered with a roof. These vessels, which are either the model or an imitation of the *caracores* of the middle ages, have also anchors of a peculiar form, like a disk, with a double quadrangular pyramid passing through it, to the end of which the cable is attached. The rowers also sometimes stand on the galleries, and in that case each boat has but one, and at the same time carries a mast (*fig. 14*). Another kind of Celebes coaster is shown in *fig. 13*, in which less account is made of the rowers, as they have two masts.

In the Manilla lagoons, and in the Philippine islands generally, we usually find very narrow vessels, and for that reason the balance frames are employed not only with pirogues, but also with larger vessels, as the coasters (*figs. 9 and 11*); they have at all events a broader or less projecting platform (*fig. 12*), in order to guard against upsetting. All these coasters are sailing vessels, and usually have two masts, each of which is made of only one piece. The sails are square and very clumsy, being made of mats like the Chinese. They almost without exception have flat bottoms and blunt sterns. Each ship has two rudders. The passenger boats of Caviteh have open pavilions, with platforms, over which a tent is extended.

b. NORTH OCEANICA, POLYNESIA, AND CENTRAL OCEANICA. On the islands forming these three divisions of Oceanica, the skill with which the natives construct their pirogues and *corocoras*, or war-boats, is carried to the high-

est degree of perfection. Pirogues, with one or two balance frames, sailing with great ease and swiftness, and adapted to coast navigation and quiet seas, are in general use among the inhabitants of the Marian and Caroline islands, and in fact among all the Polynesians. The people of the Caroline islands, especially of the Guliai groups, are the most skilful and fearless mariners of Oceanica. Their pirogues are the swiftest and most complete known. These islanders divide the points of the compass precisely in the manner which prevailed among the Greeks and Romans from Alexander to Claudius. At the other extremity of Polynesia the natives use large double pirogues, in the management of which they exhibit quite skilful seamanship. The New Zealanders have splendid war pirogues, without balance frames, but they never go out of sight of land, like the islanders just mentioned, who steer by the stars. These pirogues, which have awakened the admiration of all European seamen, have until recently been the objects on which the natives bestowed all their industry and skill. The simplest pirogues, hollowed out from the trunk of a tree, may be found in many other places, but the double pirogues, or those fitted to each other in pairs, cannot be found in so great perfection among any other people. In Tahiti and the island of Pomotoo, there are similar double pirogues, which are adapted to long trips, carrying a supply of provisions for the sailors, who live in a wooden box erected over the boat. The hull of each of the two pirogues is covered with planks nicely fitted together, carefully caulked, and protected with a water-proof cement. The rudder is remarkable for its ingenious mechanism. These pirogues were formerly ornamented with carved wood-work, which is seen at present in the slender vessels of the New Zealanders. They are everywhere alike, being the remains of the traditional art which these people have preserved. Their excellent finish is surprising, when we consider the rudeness of the tools with which they are constructed. The double pirogues are in use in Tahiti and the neighboring groups of islands, in the Sandwich islands, and the Marquesas. They are not found in New Zealand, as the nature of the bays of that island requires light vessels; yet it would seem as if they had been used there also. All the New Zealand vessels have on their elevated prows a hideous head, with the tongue protruding, this being regarded as an emblem of war and glory. The stern terminates in an image four feet high, representing a god and endless circles. This is evidently symbolic.

SHIP BUILDING.

1. THEORETICAL PART.

The art of ship-building, in all its departments, depends on the laws of physics, especially of statics and dynamics. We must hence consider the points of mathematical and mechanical science which relate to this subject before commencing the description of its practical elements. The capacity

of a body to sustain itself wholly on the surface of the water, or to sink partially, is determined by the difference between the weight of the body and of the quantity of water which it displaces; this difference, under all circumstances, must be kept as great as possible.

1. DETERMINATION OF THE WEIGHT. We must first ascertain the entire weight of the vessel, as this is the basis of all subsequent calculations; but a vessel contains such a variety of parts, and they are so irregular, that this calculation is subject to great difficulties. In the calculation of irregular surfaces and solids we have several approximate methods, where strict accuracy is impracticable. For instance, we take a given axis of the body as the line of abscissas, and erect upon it ordinates at equal distances from each other, and the exactness of the calculation will be in proportion to the number of ordinates. From these abscissas and ordinates Atwood determined the cubic contents of an irregular body by the formula $(S + 2P + 3Q) \frac{3i}{8} = x$, S representing the sum of the first and last ordinates, P the sum of the fourth, seventh, and tenth, &c., ordinates, Q the sum of the second, third, fifth, sixth, eighth, and ninth ordinates, and i the magnitude of the equal abscissas. We thus obtain the area of any number of sections taken at pleasure, from which we may easily calculate the cubic contents.

2. DISPLACEMENT OF THE WATER. We know from hydrostatics that every floating body, whatever be its figure, displaces a portion of the fluid of a weight precisely equal to its own; hence, we may determine the weight of a ship by ascertaining the weight of the water which it displaces. This is a simple calculation, as we have only to determine the number of cubic feet in the part under water, its figure and dimensions being given; but the displacement of the water by a vessel varies with the height of the water-line; the lowest water-line gives the minimum, that is to say, the weight of the ship when she is launched; while the highest gives the maximum, or the weight of the ship after she is fully equipped for service, and with her cargo on board. The determination of this displacement is a problem of great importance. The form of the ship, after it is finished, may certainly aid the builder in the solution, but there are often cases in which we are obliged to go back to first principles, and then the calculation becomes quite complicated. An approximate method has been proposed by Bouguer, who takes the body of the ship as a semi-spheroid, which figure it in fact resembles more than any other; now, since the contents of a spheroid are equal to $\frac{1}{2}\frac{1}{4}$ of the contents of the circumscribed parallelopipedon, he assumes that we shall obtain the displacement by taking the parallelopipedon formed by the three dimensions of the ship under the surface of the water. The formula given above applied to the body of a ship renders a result so exact, that in ships of 3,000 to 4,000 tons the discrepancy will amount to scarcely half a ton. We must have the ground plan and elevation of a ship in order to determine the displacement (*pl. 7, fig. 1*). Let ABCD be the elevation of a ship, and WW the water-line, for which the displacement is to be ascertained. Take the points E and F in this line at the distance of several feet from the stem and stern-post, and divide the line EF into several parts at pleasure, using an odd number, however, or a multiple of 3 + 1; through the points of division

draw the perpendiculars 1.1, 2.2, 3.3, to 28.28, and the ship will be divided into a certain number of equal vertical parts. Now, let OPO (*fig. 2*) be a section of the ship, in which the lines 1.1, 2.2, 3.3, 4.4, represent transverse sections to the outside of the ship, at the different heights 1, 2, 3, 4, of the sketch (*fig. 1*), observing that at the right of our drawing the sections are forward of the centre of the ship's profile, and at the left are abaft the same. Divide the height under the water-line, WW (*fig. 1*), into feet, draw horizontal lines through the points of division, so that the ship's body will be divided into a number of equal horizontal parts, corresponding to the division in the section (*fig. 2*). Measure half the breadth on the different horizontal lines, according to the scale of the ship, and it will give the value of the numbers required in the calculation. This half breadth may also be found by the plan of the water-line (*fig. 3*); double the results thus obtained, and it will give the displacement for the portion of the ship's body between E and F (*fig. 1*). For the portions forward of Ff and abaft Ee the calculation can be easily made, and the results added to those obtained before. In determining the displacement, some inches must always be added when the ship is at anchor in rough water or at flood tide, or under a press of sail at sea. This is on the principle that a particle of water which is in motion, and reaches the surface of a body, no longer exercises its pressure on all sides, but strives to escape in the direction of its motion, and hence its vertical pressure against the body is diminished, which must accordingly sink deeper than when the water is quiet. The pressure of a particle of water in motion is in proportion to its depth below the surface, less the depth proceeding from the velocity in the direction of the motion. This is shown by an experiment of Romme. He took two tubes (*fig. 4*), one straight, *ab*, the other bent, *cde*; both were open, and so wide that they could admit the float *gf*, the lower end of which was cork and the upper a graduated rod. These tubes were first immersed in standing water, the float was inserted, and the degree of immersion noted on the scale; they were then placed in running water flowing in the direction *hi*, the bend of the tube, *cde*, lying with the stream, when it appeared that the float was immersed one inch deeper. When the bend of the tube was held against the stream, the float rose an inch higher than in standing water. Upon measuring the velocity of the water, it was found to be seventy feet in thirty seconds; and according to the velocity, the water must have risen or fallen in the tube about 1 inch 1 line.

As salt water has a greater specific gravity than fresh, a ship sinks deeper in the latter, making a difference of about six inches in a ship of the line of 120 guns.

3. CENTRE OF GRAVITY. It is important to ascertain the *centre of gravity*, not only of the part of the ship displacing the water, but also of the whole body of the ship, since the sailing of the ship depends on the right position of this. The method of determining the gravity of each is explained in Statics, and we need add nothing to what has been said above. In like manner, when we wish to determine the centre of gravity of the immersed portion, we must find also that of the part above the water, it being necessary that they both

should lie in the same transverse plane for the ship to sail well. If it appears from calculation that this is not the case, the necessary changes must be introduced.

4. *STABILITY.* The *stability* of the vessel may be regarded in two points of view : first, the hydrostatic, when the floating body is at rest ; secondly, the hydrodynamic, when it is in motion. A parallelopipedon whose specific gravity is not more than 0.211 will always float with one surface out of water, but as the specific gravity increases the surface inclines, so that with the specific gravity of 0.75 the diagonal of the body lies in the water-line, and it then always turns in the water. This proposition is of great importance to the ship-builder, as it affects the form of the ship's body.

It is evident that the resultant of the force exercised by the water in order to sustain a ship, and to counteract its tendency to fall on the side, operates through the centre of gravity of the immersed part, and that the direction of this force is perpendicular to the surface of the water. Hence, when the ship tends to fall over, the force of the water strives to restore it to its place, and the amount of this force measures the degree of stability. Whenever a ship assumes the direction represented in *pl. 7, fig. 5*, a prismatic body, *E*, emerges from the water, while another, *I*, must be immersed. Both these portions, dissimilar as they may be in the form of the ship, are necessarily of equal weight, since the effect of their pressure is the same, and their line of intersection, *S*, must be straight, and at the same time parallel to the axis of rotation which passes through the centre of gravity *G*. Let *ab* be the line which separates the immersed portion from the portion not immersed, *G* the centre of gravity of the whole ship, *F* the centre of gravity of the immersed part when the ship stands upright, and *Q* the same point when the ship inclines to the side. Now suppose *QTVM* drawn perpendicularly through *Q*, the lines *FT* and *GV* through *F* and *G*, perpendicular to *QM*, and through *G* the line *GO* parallel to *QM*, intersecting *FT* in *O*. Now, since in the inclination of the ship the volume *E* is taken away and the volume *I* added, and since the contents of every volume are supposed to be combined at its centre of gravity, it follows that the volume *E* will appear transferred to *I*; and calling the horizontal distance of the centre of gravity *y*, we have the momentum *yE* or *yG* proceeding from the transference of *E*. Now, when the ship inclines at the angle *ASa*, or the equal angle *FGO*, the water must act upwards in the direction of the line *QM*, and in proportion to the weight of the ship or its pressure, which we will call *D*; and the force which is to restore the ship to an upright position, or rather turn it around the axis passing through the point *G*, is, according to Attwood, $D \times GV = D \times FT - D \times FO$, and since $D \times FT$, the horizontal momentum produced by the transference of *E* to *I*, is equal to the momentum of *E*, that is, equal to *yI*, we have $D \times GV = yI - D \times FO = yI - D \times FG \times \sin. FGO$. Now putting *i* for *FG*, and *s* for *sin. FGO*, the angle of inclination, we have the formula for determining the stability of the vessel, $D \times GV = yI - Dis$. The simple inspection of *figs. 6 and 7*, where *A* and *B* represent two ships with equal water lines and equal centres of gravity both of the whole and of the immersed parts will show, that if the side lines of one ship

under and over the water form receding angles, and in the other salient angles, both being equally acted on by wind and sails, one ship will have the greatest security and the other be exposed to the greatest danger, although the formula for stability gives the same value in both cases. It hence appears that this formula must be used with great caution and judgment. The actual stability must be determined from the given formula, since in most cases the two bodies E and I are not actually equal, and their line of intersection would lie to the wind side of the water-line. Hence an eccentricity of from $\frac{2}{10}$ to $\frac{3}{10}$ of a foot has been assumed in the transverse section of the ship for the line of intersection of these two surfaces. We must, therefore, calculate the contents of the two bodies, whose transverse section is a mixed triangle, one side of which may be regarded without error as a part of a parabola. Having completed this calculation, we must calculate the true contents of the parts immersed and emerged by the inclination, according to the proper formulas, and if it should appear that they are unequal, we must take another point until we obtain this equality. Supposing that we have at length obtained the position of the true inclined water-line, we can proceed to calculate the stability by the formula $\int WZdx + \int wzdx - Dis$. The integral of the function $WZdx$ is obtained by the above mentioned sectors; the different values of Z and z are obtained by calculation, and the values of W and w are found by the following method. Let SBD (*pl.* 7, *fig.* 8) be one of the sectors, SD the straight, and SB the inclined water-line. The line DB divides the sector into a triangle and the adjacent parabolic surface. Bisect BD at E, draw EG perpendicular to BS, and take $EF = \frac{2}{3}$ of this line. From E and F drop the perpendiculars EG and FH on SB, and $\frac{2}{3}$ SG will be the distance of the centre of gravity of the triangle SDB from the point S, measured on the surface of the water, and SH the distance of the same point to the centre of gravity of the curved surface DCB. Hence the formula $\frac{2}{3} SG \cdot SBD \cdot SH \cdot BCD$ gives the value of WZ for this sector, and applying the formula for the equidistant ordinates (see § 1, p. 31), we determine the integral of $\int WZdx$. We make use of the same process to obtain the integral of $\int wzdx$. As regards the function Dis , the displacement D has been already calculated, and s the assumed angle of inclination and the element a , which depends on the true position of the centre of gravity, can only be found by calculation or experiment with a ship of precisely similar construction. We can hence determine the true measure of the stability by the formula $D.GV = \int WZdx + \int zwdx - Dis$. A simple method of finding the centre of gravity of the ship's body has been given by Abethell, who takes his data from docking the vessel, which of course is done at high water, the water passing off with the ebb tide, and then the dock-gates are closed. He takes the time when the extremity of the keel touches the foundation of the dock, as the water passes off. From that time the water gradually leaves the after part of the ship, while the bows are immersed to a greater depth, and an equilibrium takes place between the total weight of the ship and the pressure of the water upon the immersed portion, until the moment when the ship is supported at both ends. During this time the ship is to be regarded as a lever of the second kind, the fulcrum

of which is the point where the keel touches the foundation of the dock, while the power and weight, that is, the weight of the immersed part and of the ship's body act in the perpendiculars which pass through the centre of gravity. All the magnitudes, save the distance of the perpendiculars through the centre of gravity, are known or may be readily calculated. If we now take AN (*pl.* 7, *fig.* 9) as the natural water-line, and KL the temporary water-line, where the keel first touches the foundation, we draw QH through the centre of gravity of the volume KFML, perpendicular to KL, and FG parallel to QH. If, then, D be the usual pressure, d that of KFML, and $GH = b$, draw SEO parallel to QH at the distance GE from $G = \frac{bd}{b}$, it will pass as well as PBO through O, the centre of gravity of the ship, when we have the necessary points for determining the distance, PBO being perpendicular to AN.

5. THE MASTS AND SAILS. Theory has hitherto accomplished little in determining the length and proportions of *masts*. We must, then, take experience as our guide. The position of the masts exercises an important influence on the qualities of a ship, a difference in them often improving the action of the whole vessel. Not less important in the art of ship-building is the form of the sails, for however perfect may be the construction of the ship's body, without a correct position of the masts and the right number of well-shaped and well-fitted sails, the desired object will never be attained. The wind drives the vessel forward while it fills the sails; they should, therefore, be as large as possible, though there are limits which cannot be exceeded without danger. We shall presently consider the dimensions, positions, and different kinds of masts and sails. The centre of gravity is a matter of importance also in sails. *Fig.* 18 represents the centre of gravity and the form of the various sails in a ship. The centre of gravity is marked by the sign \odot . C is the centre of force of the whole system, and D the line of draught.

6. STOWAGE, ROLLING, PITCHING, AND FALLING OF A SHIP. An important point in the construction of a ship is the *stowage*, or the distribution of the burden in the hold. We have many examples showing that a ship built on the best model sails much worse than an inferior vessel, because it is not well stowed. The main point in stowage is to bring the centre of gravity as low as possible, so that the ship may resist the action of the wind on the sails with the greatest possible uniformity.

All the calculations of equilibrium which we have thus far presented are disturbed by the action of the winds and sea, and hence new mechanical conditions must come into play. These produce certain motions of the vessel which may exert a very unfavorable influence not only on its sailing, but on its firmness in general. Among these motions is the *rolling*, when the ship constantly inclines from one side to the other. This is produced either by the shock of a wave against the side of the ship, when it takes place above the centre of gravity, or by the motion of the waves among each other. *Pl.* 7, *fig.* 19: let ADB be the transverse section of a ship, AB the water-line, E the centre of gravity of the whole ship, and G the point where the surface of the water would intersect the perpendiculars through the centre of the laden ship, and BH the direction of the force

which brings the ship into the position *ab*. The force which produces this inclination is represented by the line EH, and the force which tends to restore the ship by the line EG. These forces, which act in opposite directions, produce the rolling, and the effect of the acting power is EH + EG. In regard to the motion of the waves, the rolling must commence as soon as a wave rises to one side of a ship and falls on the other. The inclination of the side of a wave gradually increases from its horizontal position to its greatest height, and conversely, thus gradually increasing the force which tends to turn the ship around its horizontal axis; and long before the roll has reached its proper height, it is met by a wave from the opposite side, which destroys its effect and prevents a further bending over of the ship. The axis of rotation here spoken of has been thus far considered as at rest; this, however, is far from being the case; instead of remaining at the same height, it rises or falls, or in fact, as often occurs, is at rest. It is found, for instance, that when there is a tendency for a greater part of the ship's body to sink on one side than to rise on the other, the axis of rotation must be elevated during the motion. In this case rolling begins and the ship is raised, while it lies on the side, and falls when it recovers itself. The opposite effect is produced when a smaller portion of the ship's body is immersed than that which tends to rise on the other side. The occurrence and the extent of this motion depend on the position of the centre of gravity and on the form of the ship's sides between wind and water. Let us investigate the case when the sides of the ship are parallel with the plane of the masts. *Pl. 7, figs. 20, 21, 22*: let AB be the water-line when the ship is upright, *ab* the position of this line when the ship is inclined 10°, and G the centre of gravity, which in the upright position is situated in both lines, but above the surface of the water in *fig. 22*, and below it in *fig. 21*, then in the first position, when immersion and emersion are equal, the ship in turning will neither rise nor fall; in *fig. 21*, when the immersion is greater than the emersion, it must rise, and in *fig. 22*, when the reverse takes place, it must fall. But when the sides of the ship diverge above the water-line, the axis of rotation (*fig. 20*), instead of being at rest, will rise, as in this case the immersion is increased. In *fig. 21*, the immersion will increase still more, and the axis, accordingly, will rise still more, and in *fig. 22*, the immersion will also increase, and the ship will fall only in a slight degree. But when, in the opposite case, the sides of the ship diverge under the water-line, and above it are parallel with the plane of the mast, the ship (*fig. 20*) will fall as it turns, the rising of the ship (*fig. 21*) will be corrected, and the falling (*fig. 22*) increased. It hence appears that whenever the equality between immersion and emersion is essentially impaired, the shock to the ship in violent pitching must be great and dangerous. In order to avoid this serious difficulty, the actual position of the centre of gravity of the ship must be calculated, and such changes made in the ship's body that when the ship turns on its axis, which passes through the centre of gravity, the immersion and emersion may remain equal. The motions of rolling will be free from all dangerous shocks whenever the ship's centre of gravity lies in or near the plane of the water-level.

Another kind of rolling, namely that in the direction of the axis of the ship, is *pitching*, in which the bow of the ship rises and falls. A wave meeting the ship raises the bow, which falls again as soon as the wave has passed, and this action is repeated with every new wave. If a ship is close to the wind, it often happens that when a wave has passed the forward part, the bows fall rapidly and only rise with difficulty at the approach of the next wave; in this case the ship is said to *pitch* (*pl. 27, fig. 2*). When a wave has passed the forward part of the ship and arrived towards the centre, a considerable portion of the ship's body is without support. This portion falls upon the surface of the water with a considerable degree of force, composed of the product of the weight of the whole forward part and the length of the unsupported part. Sometimes this motion takes place at the stern, and then the ship is said to *fall*. Both cases are equally unpleasant in their effects, as they diminish the rapidity of sailing and expose the ship to great danger. The defects which the ship-builder has fallen into in this respect may often be partially remedied by experienced seamen, if they take great care in the stowage and place the greatest weight in the centre of the ship.

7. FASTENING THE BODY OF THE SHIP. We know from common experience how difficult it is, even in the most simple carpentry, to preserve the shape of a building, and we are hence obliged to use a variety of braces and supports. But in ship-building the preservation of the form is far more important and more difficult, as the greatest danger would arise if the ship on leaving the stocks should become loose in the different parts and not retain its prescribed form. We have examples of such accidents. In ship-building especially theory and practice must go together. It is not only the violence of storms which tends to disturb the form of the vessel, but the pressure of the water even when quiet, which properly sustains the ship, exercises a similar force. If we draw a straight line from the stern to the stem of the ship, while she is still on the stocks, this line will often be deflected some five or six inches as soon as the ship touches the water. This is owing to want of precision in the work. Whole planks and connecting pieces are often forced out of place and broken. The length of a seventy-four is 170 feet or more, and only a slight knowledge of the strength of materials will show that in so great a length the strongest timber must bend under its own weight, and a change of form, therefore, is almost unavoidable. Seppings, one of the best English ship-builders, has endeavored to avoid this difficulty by the plan of oblique bands. We know that a mere quadrangle can never be firmly put together, but that the simplest lattice-work must have an oblique band, in order to hold its shape. If we compare *pl. 7, fig. 5*, which represents the old system of ship-building, with *fig. 6*, which indicates the main principles of the new, we shall perceive that the advantages of Seppings's plan are in proportion to the lengths which we have to deal with. The effect of the triangular system is to give the pressure in the direction of the fibres of the timber, while in the rectangular system the strain comes across the grain. *Pl. 9, fig. 1*, shows an interior view of the side of a seventy-four according to Seppings's system, where the diagonal

pieces diverge from the other timbers at an angle usually of 45° . In the forward part of the ship, these diagonals run in a different direction from those in the rest of the vessel, and are at a distance of six or seven feet or more from each other. Their upper ends rest against the horizontal frame of the beams of the gun-deck, while their lower ends are supported by the first planks of the keelson, except in the centre, where they meet the planks lying on each side of the keelson in order to receive a part of the pressure of the main-mast, which always bears hard upon the keel, and often with injurious effects. Other timbers are placed in each direction upon the joints of the frame timbers, and connected with the knees and ribs, so as to form an entire system of immovable rhomboidal parts. A beam is placed in each division, in an opposite direction to the inclination of the diagonals, dividing the rhomboids into two equal parts, and according to Seppings these beams are like the key-stone of an arch to the diagonals. This arch-like arrangement of the diagonal timbers not only prevents any change in the direction of the length, but also presents a resistance to the outward pressure from below.

The beam-work in the new system is constructed almost precisely like that of the old, except amidships, where the greatest strength is required, and where Seppings introduces two additional timbers. They are all laid in the inside, either on planks or frames, which are designated by E in *fig. 2*. They are connected together at different lengths by dovetails or round pins, so that they form a resistance to the longitudinal pressure. In *pl. 9, figs. 1 and 2*, A is the keelson, with the additional beams; B, the diagonal timbers; C, the lengthwise pieces; D, their braces; E, the inside frame, supporting the upper part of the diagonals; F, supports for the braces between the port-holes; G, braces; H, blocks under the supporting planks and frames for the iron knees, of which we have a front view in *fig. 3*. In the old system, the deck planks formed nothing but platforms; but in the new system (*fig. 5*), with the exception of the forecastle, round-house, and quarter-deck, they are laid diagonally, giving an additional support; *fig. 4* shows the construction of a ship's stern on Seppings's plan, with all the braces and necessary iron-work. The helm-port-transom is here left out, which formerly was one of the heaviest and most unmanageable timbers in a ship.

If we examine more closely the principles of Seppings's system, which is now adopted in the British navy, we arrive at the following result. Through the point at which the supporting forces act, draw a line representing the direction and magnitude of the draught power, and taking this as the diagonal of a parallelogram, the sides of which are parallel to the supporting forces, draw through the point from which the supporting forces act a line parallel to the former; then all parts of the connexion on the same side of the draught-line will be in a state of pressure, while those on the opposite side are in a state of tension. The first object of the diagonals is to prevent the timbers from bending. If we regard AF (*pl. 7, figs. 25, 26*) as the neutral line from which the curvature extends to both sides, it is evident that nothing but the construction shown in *fig. 25* can prevent it, for since A in this figure is supposed to be one of the neutral points of the system, it

must be considered as firm, and the inclination to curvature which tends to displace the points H, C, G, and B, as well as the action on the supports AC and AB, according to the weight applied, will operate to stretch the timbers, which can be prevented only by the application of these bands. But the action of the bands is entirely in the direction of their length, and hence tends to prevent any change of form, so that the force which tends to displace the point C, is removed by the resistance of the brace, AC, and of the band to the firm point F, and thus an additional strength is given also to the point E; the action of the force which tends to displace the point H, in common with C, is set aside by the firmness of the long internal timber AH, and the resistance of the band HF; so that if the materials are sound, no displacement or change of form can take place. If we now consider the opposite construction (*pl. 7, fig. 26*), it appears from what has been said, that the braces, AC and AB, are exposed to a pressure; and since the point, A, according to the supposition, is neutral, and therefore firm, the pressure must bear upon the point C, and produce a curvature. But the tendency to press upon the point C is not set aside by the action of the band FE, and consequently, since the point F, according to the supposition, is firm, the tendency to extension in the brace must press upon the point, and still more, consequently, upon the point C. The point E, thus acted on, must communicate its own inclination to the band EH, and produce a sinking at the point H. Every part of the framework, from C to H, is thus subjected to pressure, and a change in the form of the ship must be the effect.

According to Dupin, the main principles in regard to the curvature of vessels are the following. 1. If a vertical plane divides the ship into two parts, so that the weight of each part is equal to the weight of the water which it displaces, then the elements of these parts in respect to this plane, that is to say, the tendency to curvature, will be either a maximum or a minimum. 2. This inclination will be a maximum, when the infinitely small part which lies on the plane of the element is directly opposite to the plane of the total element. 3. The inclination will be a minimum, when the element on the plane acts parallel to the total element. Let the lines AO (*fig. 27*) coincide with the surface of the water, the different sections AC, CE, EG, GH, HK, KM, and MO lying in the same. On some of these segments take the triangular surfaces which represent the difference between the weight of the transverse sections and their pressure on the water. On the segment AC = 49, the right-angled triangle = +72 will lie under the water-line, because the weight exceeds the pressure; on CE = 20, the equilateral triangle CDE = -108, stands above the water-line, because here the pressure exceeds the weight; on EG = 50 stands the triangle EFG = +118; GH = 6.6 is too small to be taken into account; on HK = 13.4 is the right-angled triangle HIK = -119, and finally on KM and MO = 17.5 and 19.5, the triangles IKM and NOM = -115 and +192. Now add together the lines, and we have 176 feet as the length of the ship, and for the sum of the differences + 37, so that 37 tons must be removed from the forward part of the ship on account of the pressure, in order to set aside the tendency to curvature.

A curvature often appears in the keel, which is sometimes bent more than two feet in the centre. Since such deflections take place, we must find the means of guarding against them. This must be effected in a manner to interfere as little as possible with the stowage. *Pl. 7, figs. 28 and 29*, show such an arrangement, in which we must bear in mind that the same space will also hold a certain number of water-casks. *Fig. 28* is the transverse section; *fig. 29*, the longitudinal section; *a*, the frame timbers; *b*, the cross-pieces; *c*, the beams over the keelson; *d*, the floor timbers; *e*, the filling between the cross-pieces, the floor timbers and their frames; *f*, frames under the deck-beams, consisting of two thicknesses bolted together in order to give the necessary firmness; *g*, upright supports; and *h*, diagonal braces and bands. All the parts must be secured in the best manner to the original body of the ship.

8. PROW AND STERN. The most ancient nations ornamented the prows and sterns of their vessels with rich and often with very clumsy work, of which we find some specimens in the middle ages. But in the year 1796 the fashion of clumsy ornaments on the prow was set aside in England, and galleries and carved work on the stern were also dispensed with. In 1811 the plan proposed by Seppings of making the prow round was introduced, and in 1816 the same shape was adopted for the stern. This secured the stern against the beating of the waves and the shot of the enemy, while it also gave occasion to apply new means both of attack and defence. The gain in point of mechanical strength by this arrangement is evident from a glance at *figs. 30^b and 31^b*, and a proof of the advantage in an engagement is shown in *figs. 32 and 33*, which represent the sterns of the frigates *Boadicea* and *Hamadryad*. In *fig. 32*, there are spaces at *A* where the guns do not range at all, which is not the case in *fig. 33*. *Fig. 30^a* shows the interior perspective view of a straight stern, and *fig. 31^a* that of a round stern.

2. PRACTICAL PART.

A. Ship Carpentry.

After the plan of the ship has been drawn by the naval architect according to theoretical principles, it belongs to the ship carpenter to execute the model, which also demands the co-operation of numerous other mechanics. Small and flat vessels are always built without any special arrangements, but for large ones places constructed for the purpose are required, as the so called dock-yards, lying near the water. Stocks made of oak blocks are used for the foundation, with their surfaces lying oblique to the water.

1. THE FRAME. The building of a ship properly commences by laying the *keel* on the stocks. This is a beam composed of several pieces, which forms the foundation of the vessel, and receives the whole length of its under portion. Its height is made greater than its breadth ($1\frac{1}{2}$ lines to a foot of the ship's length; and $10\frac{3}{4}$ lines broad to an inch in height) in order to guard

against leeway and to increase its capacity for bearing weight. The stem and stern-posts are mortised to each end of the keel at obtuse angles. The former consists of one or more pieces of curved timber, of equal strength with the keel. Behind this is placed the apron, which is of equal breadth, and one third thicker. A knee passes under it to secure it with greater strength to the keel. The stern-post stands inclining back from the keel, in its mortise called the heel. Its thickness equals that of the keel; its breadth increases towards the lower end five lines for every inch in height, and lessens about one eighth at the top. It also has an apron, with a knee. In large ships there is another post on the outside, which receives the sockets for the rudder pintles. The stern-post must have great strength, as it bears the rudder and the beams which form the stern-frame. The principal timbers in this are the transoms and fashion-pieces. The transoms are placed crosswise of the stern-post, to which they are bolted. Their ends are fastened to the transom knees. The fashion-pieces are similar to the transoms, but shorter, and also bolted to the stern-post and the transom knees. Besides these are the braces between the bottom of the stern and the transoms. As soon as the stern and stem-posts are erected, a rope is stretched from one to the other, perpendicularly over the keel, in order to guide the carpenter in the symmetrical construction of the remainder of the vessel. The inside timbers (the bow timbers and quarter timbers), consisting of several pieces, are then placed at certain distances on each side of the keel. The form of these timbers, which make an arch of more or less curvature, together with the position of the stem and stern posts, determines the shape of the ship's body. These timbers are either placed directly on the keel, or on planks with which it is covered. A strong piece of timber, called the kelson, is placed over the ends of the timbers resting on the keel, and bolted to them and the keel. These timbers are protected by thin ribbons of wood, running the whole length of the vessel, which are removed when the vessel is planked. *Pl.* 8, *fig.* 1, represents a ship of the line on the stocks.

The deck timbers are then placed across the ship, which not only support the deck planks, but also hold together both sides of the ship.

All the parts of the frame are made of oak timber, and are fastened with iron or copper bolts and nails. In the East Indies teak-wood and oak are used, and in South America and other warm countries mahogany and cedar. In Sweden and Norway fir timber is also used, but this is wholly unfit for ships of war, since it is splintered by gun-shot, which is not the case with oak timber, a cannon ball passing through that making a round hole.

2. PLANKING. When the frame is completed, the main or outside planks, which form the covering of the vessel, are laid on the ribs throughout its whole length. These form the principal connexion between the different parts, and protect the vessel from the pouring in of the water. The bottom planks are grooved to the keel; the ends of the fore and aft planks are attached to the stem and stern-posts in the same manner, but are connected with each other only by close joints. The narrow space between two planks is called a seam, and is caulked with oakum and coated with hot pitch (*pl.* 8,

fig. 3). After the vessel is caulked, the remaining pitch is scraped off. When subsequently the caulking is repeated on the water, it is burnt off (*pl. 8, fig. 4*). The planks are fastened with strong nails, and also with screw-bolts. The cross seams are made to come on good timbers, and the different courses must be jointed at least five feet apart. In ships of war, the cross seams must not come over or under the port-holes. The thickness of the outside planks varies. The bark-planks, which go round the body of the vessel like a belt and form a projection, are twice as thick as the others. Large ships of war have several courses of these planks. The planks on the bow and under the chain-plates are as strong also, the rest are weaker. In large ships, the outside planks are four and a half inches thick, and in small vessels never under two inches. The planks on the bow are warped by fire. The sides of the ship are also covered with planks inside. Sometimes a course is here and there left open, in order to give the air access to the timbers. In ships of war, the French have found an advantage in filling the space between the planks with cotton, in order to weaken the force of cannon balls.

The planking being finished, the next step is to construct the decks. The larger class of ships have several decks. In ships of war only those which carry guns receive that name. The rest have different names, for example, forecastle, orlop, quarter-deck, and so forth. The decks are composed of timbers lying crosswise, and planks placed over them lengthwise. The beam ends rest on a frame of strong timbers which run from the stem to the transoms, close to the ribs. At the head they are joined to the side-timbers with wooden or iron knees. In the centre, the beams are supported by upright posts. Their distance from each other depends on the position of the masts and hatchways. Half-beams are added when they stand too far apart. The largest beam lies amidships, and is called the sail-beam or the main-beam. The beams of the lower deck are shorter than those of the upper, as men-of-war have the heaviest cannon on the lower deck, and in general all the heavy parts must be placed as low as possible. The decks are slightly raised in the centre, so that the water may run off at the sides, passing through the scuppers, which are small holes lined with lead. The decks also sink a little fore and aft towards the scuppers which are at each end.

3. FINISHING OF THE CONSTRUCTION. After the carpenters have completed the decks, they proceed to construct the hatchways, the ladders, the mast steps, the chain-wales, the pumps, the capstan, the railings, and the hawser-holes, and if the vessel is a man-of-war, the port-holes. The *hatchways* are square openings, like trap-doors, leading from one deck to another. Ships of war have five or six hatchways; merchantmen usually have three, the main hatchway and the fore and aft hatchways. The main hatchway lies forward of the main-mast, the fore hatchway aft of the fore-mast, and the aft hatchway abaft of the main-mast. There is also an opening at the mizen-mast, but this is called the door, and the sky-light of the cabin. In order to prevent the water from running through the hatchways into the ship, they are surrounded by a frame six inches high (the *coamings*), and covered with caps and tarred sailcloth, *tarpaulin*; when they are open a

wooden grate is placed over them. In ships of war, nearly all the hatchways are provided with convenient ladders, but in merchantmen only those which lead into the cabin and forecastle. The ship is reached from the water by ladders, called accommodation ladders, extending at the forward end of the quarter deck from the water to the sides. One is on the starboard side and another on the larboard. (If one stands at the stern of a ship and looks forward, the side on the right of the mast is called the starboard, and on the left the larboard). The accommodation ladders are of different kinds; those on the starboard side are used only by the officers and visitors. In ships of war there is a broad wooden ladder held obliquely by supports, and for the sole use of the captain and superior officers; the ladder ropes are covered with red or green cloth. Besides these there are state ladders, with iron railings and landings, used when the ship is visited by admirals or royal personages; ladies and invalids are drawn up on the deck in an arm chair, which is raised by a tackle attached to the main-yard.

The *mast steps* are blocks of stout timber, surrounding the heel of the mast; those for the foremast and mainmast are on the keelson, and those for the mizen-mast on the beams of the lower deck.

The *chain-wales* are strong planks bolted edgewise against the sides of a vessel, abreast or abaft of the masts, and serving to keep the shrouds from the sides of the vessel; they are fastened above and below with knees, clamps, and chains, to the planks and timbers.

The ship's *pumps* (*pl. 10, fig. 10*) stand near the mainmast and abut below between the timbers, where the water which finds its way into the ship is collected. In large ships of war they do not rise above the lower deck; together with the masts, they are surrounded by a case of strong boards to protect them from injury. A is the pump-stock; B, the upper barrel; C, the upper box, and D, the lower box, both with suction and pressure valves; E is the support for the handle; and G, the upper case, with a spout. Merchantmen usually have only two pumps on each side; men-of-war from two to four, according to their size. Chain pumps are used in the British navy, which are worked with wheels or drums, and have been found very effective.

The *capstan* (*pl. 9, fig. 26*) is a windlass to heave up the anchor, or to raise other heavy burdens; it consists of an upright shaft, in the shape of a truncated cone, around which the rope which lifts the burden is wound; in the upper part there are square holes, into which the sailors thrust the handspikes in order to turn the capstan; at some distance below there are notches, in which are placed iron pawls, to prevent a recoil. Large ships of war have capstans with internal wheel-work; such vessels have three capstans. The main capstan is placed on the lower deck, abaft the mainmast, and its shaft extends to the keelson; above, it passes through the beams of the upper deck, forming a second capstan, which increases the power of the lower one. The forward capstan stands on the upper deck, between the mainmast and the foremast, and the other capstan on the forecastle.

The common *windlass* (*pl. 10, fig. 11*) is used in merchantmen; it stands on the forecastle, between the foremast and the prow, extending horizontally

across the vessel. It consists of an octagonal axis, C, which, at the socket A, is made round; the heads are octagonal, and have holes for the handspikes; aft of the windlass is the post, G, on which also the ship's bell is hung, bearing the tooth-work (*fig. 12*), with the pawls, *aa*, and the support, *b*. A tooth-work wheel, *c* (*fig. 13*), is attached to the windlass, C, in which catch the pawls, *aa* (*fig. 12*). But if the windlass is to remain at rest, it is secured by the large wheel (*fig. 12*), which is moved by the support, *b*.

All the parts of the deck which are in the open air are surrounded on the outside border by an inclosure, consisting principally of the *bulwarks*, which are a continuation of the timbers lined with planks, and covered with a plank on the top. The bulwarks are usually from three to four feet high; the almost semicircular part surrounding the bow, the arch of the fore-castle, is the highest. The railings are covered with thin boards, which in some places are made to turn on hinges, especially at the part of the deck on both sides of the bow and main hatchways; in ships of war, the gangways. In small merchant vessels there is no railing, and a bar or small rope is used instead. The bulwarks in ships of war are differently arranged, and higher throughout, at the quarter-deck being from five to six feet high. The railing is made of double iron posts, with holes at the upper end, through which a strong rope is drawn; from this rope a net-work of small cords is fastened to the bulwarks on both sides, between which, during the daytime and when preparing for battle, the hammocks of the crew are stowed and covered with tarpaulin.

The *hawse-holes* are round holes in the bow, near the stem, for the cables; they are lined with lead or copper, so that the water cannot penetrate to the timbers of the ship (*pl. 12, fig. 3, L*). Behind the hawse-holes is a trough in which the water dropping from the cable is collected, and passed off through the scuppers.

The *port-holes* are embrasures in the sides of a vessel through which the cannon are pointed; they are surrounded by a frame of strong posts, consisting of upper, lower, and side supporters, and are closed with shutters, called port-lids, hung on hinges, and drawn up by a rope inside.

Besides the parts of the ship now described, there are others arranged at the same time; for example, the *cat-heads*, being two beams, with light carved work, which project over the bow on the right and left of the fore-castle; the outer part has metallic disks on the forward end; the inner goes down to a deck beam, to which it is bolted. They are used, after the anchor has been heaved up above the water by the windlass, to suspend it clear of the ship and ready to be dropped.

The arrangements for *belaying* the running rigging are of different kinds. There are *belaying-pins*, *cross-pieces*, *cleats*, and others. *Belaying-pins* are iron or wooden pins, placed in the rail at the mast or at the side. *Cross-pieces* are distributed along the bulwarks, consisting of two vertical and two horizontal pieces; the upper ends of the head-pieces are sometimes at a distance from the rail, and spread apart from each other, so that the

fore and main jeers and other large ropes may be made fast to them. *Cleats* are small pieces of wood with two diverging arms, which are nailed to the railing or to the masts.

The last work on the ship before launching is the completion of the stern, with its ornamental parts, the arrangement of the stern and quarter galleries and of the ship's head, the sheathing of the ship's bottom with copper, and painting the ship. The stern is the most ornamental part of the ship, and is often decorated with carving. The name of the ship is inscribed under the cabin windows; on the taffrail over the stern is the flag-staff for the national colors. Ships of war have here the large lantern.

Galleries are found only in men-of-war and large merchantmen. The quarter-galleries pass round on the side of the cabin, with which they are connected by a door; they are generally closed in; the larboard gallery has a water-closet, and the starboard other conveniences. Two-deckers have two galleries over each other; the upper one is generally open. The stern-gallery is a walk four or five feet in breadth, running before the cabin windows, and communicating with the cabin by a glass door. Three-deckers have two such galleries.

The ship's *head*, like the beak of the ancient vessels, forms a projection on the bow, consisting of several pieces and connecting with the stem. It aids the ship to cut the water, and gives greater firmness to the bowsprit by rigging; but its great use is to enable the ship to lie close to the wind; and as it is embellished with carved work, it forms an ornament to the vessel. It has a gallery with railings, the floor of which usually consists of lattice-work. The washing of the ship and the butcher's work are done here.

The *coppering* of the ship's bottom consists of plates of the thickness of sheet-iron, nailed to the planks with copper spikes; it reaches only from the bottom to the water-line. It serves to protect the vessel from worms, barnacles, and sea-weed. The ship is painted as soon as the coppering is completed; the usual color is black, but the ornamental parts are touched off with yellow or white. All the other work is done after the vessel is launched. Launching is an occasion of great ceremony (*pl.* 8, *fig.* 2); the ship either slides down on a cradle, or directly on the stocks. The ship is dressed with flags and banners, and the officers, invited guests, and numerous strangers are on board; and as soon as the last prop is knocked away, and the rope which holds the ship on the stocks is cut free, the crowd of people on the deck, with their motions, cause the ship to quiver, and she begins to glide slowly at first, and then with a rapidly accelerated motion. All the timbers of the ship crack; the keel is so heated by the friction that it takes fire, and water must be poured on. As soon as the ship touches the water she makes a plunge, but soon rises, and shoots forward in the water.

The first thing after the vessel is launched is to ship the *rudder*. This is hung by strong hooks, called pintles, to the stern-post, and swings like a door on hinges. It is made of oak timber of equal strength with the stern-post, and passing down to the same depth. On the

back of the lower part there is another piece of timber, shaped like a wedge, with the point turned upwards. To this is attached a third piece of similar form. They both reach only to the surface of the water. The upper part of the timber passes through the helm-port. There is a square hole in the rudder-head, through which the *tiller* passes which turns the rudder. As the tiller exerts a great power, it cannot be worked by hand. Two ropes are, therefore, attached to its forward end, running on blocks along the two sides of the ship. These are called tiller-ropes. They pass in opposite directions over an upright wheel, with hand-spokes. As the wheel is turned, one rope winds, while the other unwinds. The rudder is thus moved without difficulty, and its position can be ascertained every moment by the tiller rope. In large ships of war, double wheels are in use (*pl.* 21, *fig.* 2).

4. RULES FOR SHIP-BUILDING ACCORDING TO SEPPINGS'S SYSTEM. All the timber should be thoroughly seasoned. The tenons of the timbers in the largest ships should never be less than three inches thick. Where timbers are to be joined together, at least two $1\frac{1}{4}$ -inch bolts must be used. If seams should appear, on account of the timber not being thoroughly seasoned, they must be closed up with great care. It must also be provided that every seam should lie higher on the outside than on the inside, so that if the water should get in, it may flow off towards the inside of the ship. Seams of more than three inches in width are to be filled with pieces of timber consisting of old oak, and altogether free from sap-wood. The fibres must run parallel with those of the timbers which are to be closed. Seams of less than three inches in width are filled with double wedges, driven at the same time on the outside and the inside of the ship. The front of these pieces while drying must be dressed with oil and tar; for this purpose, small holes are often bored in their head and oil poured in. *Pl.* 9, *fig.* 6, shows a seam closed up at A, an opening of less than three inches at B, and an opening of more than three inches at C. D is a filling with wedges, the fronts of which are both inside and outside; E is a usual filling where the fronts appear above and below; F are seams which must be caulked. All the planks are to be fastened to cross-pieces, as in *fig.* 7, their joinings being made to correspond. The clamps are secured to the framework in the same manner, with the addition of vertical bolts, as in *fig.* 8. In order to bring the diagonal timbers as near as possible to the supporters under the frame-pieces of the gun-deck, a corner of six inches may be taken from the bottom of the beam of the upper course, as in *fig.* 9. If frame-pieces for the upper deck of sufficient breadth are not to be procured, we need not hesitate to join the sides of the timbers, so as to form a wedge-shaped piece connected by double notches, as in *fig.* 10. In order to avoid the accumulation of water on the upper side of the water-ways, they must spread in from the timbers so as to lie deeper than the connecting pieces, as in *fig.* 11. The joinings of the water-ways must be so arranged that they will fall on the centre of the keelson, and that the descending part of the channel below the joining shall be in the direction of the side of the beam, as in *fig.* 12. The diagonal seams under the water-ways must be thoroughly caulked, for which purpose the curved iron stoppers are used,

as shown in *fig. 13*. A plan of convenient cross-bolting is shown in *fig. 14*. Here especially no unseasoned timber is to be used. *Fig. 27* shows a longitudinal section of an English 120-gun ship; *figs. 18, 19*, plans. The manner in which merchant ships are built is by no means suited to the present demands of ships of war. The joinings of their timbers and frames and the arrangement of their materials are of such a character, that while one half forms a kind of arch, the other half and the connecting pieces are only loosely put together, and are secured by the planks instead of giving to them a firm support, as they should do. Such vessels can never have the same stability as if all the parts were connected in the manner of an arch, according to the plan proposed by Seppings.

There is a great defect in the manner hitherto adopted of joining the separate parts of the same timber. This is usually done by the addition of a third piece, *A*, shaped like a wedge (*pl. 9, fig. 20*). More than 550 such pieces are used in a 74-gun ship, and no fewer in an East India merchantman of 1200 tons. On thoroughly overhauling a vessel for repairs, not one of all these pieces is found to be in good order, and they, moreover, will be found to have damaged the timbers to which they are applied. Besides, the timbers cannot be bent sufficiently without destroying their fibres. There is a great loss of material also by cutting off the corners of the timbers which are to be connected by the wedge-piece. No doubt, these pieces were first made use of when none but too short or imperfect timber was to be had (*fig. 21*); but the requisite curvature can be obtained by a peculiar arrangement without such a great loss of material. The frames of merchantmen, before they are joined together, are partly shown in *fig. 24*, and too often, in consequence of bad work, the parts are often not accurately fitted to each other, nor to the timbers with which they are connected. There are, moreover, many defects in the connexion with the keel. In order to obviate all these difficulties, Seppings proposed the combination (*figs. 22 and 23*), in which the connecting timbers are a little shorter and not so much bent, nor so much cut through the fibres. The connexion is also made firmer by using a pin (*I*) instead of the wedge-piece. Another advantage, finally, is that when the ship grounds the timbers give the whole structure more firmness and support, as is shown by the dotted line at the bottom of *fig. 23*. In regard to the general security of the arrangement, it will be seen from *figs. 25 and 15* that the timbers regularly cross the keel, and that the frames in the vicinity of the lower deck at *K* compose a firm ship's body, while only a few courses of planks, *L*, are applied at the joining of the timbers in order to give greater strength at these places. The other inside courses of planks may be left out, and instead of them double upright pales placed between the planks and the timbers, as at *M*. This gives more room for stowage. Water-ways, *N*, between the planks conduct the water to the pumps, which now reach the water themselves, and hence there may be standing water in the space, as all the gutters can be easily cleaned. The timbers which (as in *pl. 9, fig. 25*) are fastened directly to the sides require no knees, or only very small iron ones. *Fig. 16* shows, in the part *P*, the old system of

fastening the beams to the stern-post by transoms, and in the part Q, the new system with curved timbers, which do away with the need of transoms.

B. Outfit of the Ship.

The *outfit* of a ship includes all those parts not immediately belonging to the ship's body, but which are necessary to the service and action of the ship. Among them we reckon the spars, the rigging and tackles, and the sails. By spars we understand masts, yards, booms, gaffs, and all the small pieces used to support the rigging and sails. The rigging comprises all the ropes employed for the support of the masts, the management of the sails, and other uses on ship-board, with the exception of the largest and most important, namely the cables, which are reckoned with the equipment, as they always go with the anchors. The tackles include all the blocks (rollers or pulleys) through which the running rigging passes, to add to the purchase.

In describing these various subjects, we will take as the model the French ship of the line (*pl. 11, fig. 1*), carrying 120 guns, and 205 feet in length and $54\frac{1}{2}$ in breadth, the large ships of war being the most complete in this respect, and containing everything which in smaller vessels is either not found at all or only to a limited extent. We would premise, in general, that all the fixtures which have the same object, or nearly the same arrangement, are called by the same name, and are distinguished from one another only by the special name of that part to which they are chiefly appropriated.

1. THE SPARS. The frame to which the rigging is attached, and by which the sails are secured and held firm, consists of what are called *spars*. These are in proportion to the breadth of beam or to some other part of the ship, so that a practised eye can determine the size of a large ship from a single piece. Of the spars, the *masts* are the most important, and of these the main-mast takes the lead, as it gives the scale for the rest. The masts, like all the spars, in general, are made of pine or fir. As no single tree is often found sufficient for the length and thickness required in the masts of men-of-war, they are composed of different pieces. A method of constructing masts has recently been introduced by Seppings, which has the advantage of great simplicity and of using shorter and weaker timber than was required by the old plan. According to this arrangement, the largest piece for a main-mast is only 40 feet long and 10 inches thick, whereas formerly timbers were used 84 feet long and $22\frac{1}{2}$ inches thick, a mast costing \$6,500 for an 84 gun-ship, while the cost now is not much over \$1,600. The new method, moreover, on account of its extreme simplicity, admits of repair with far greater facility. *Pl. 7, figs. 10–17*, show the construction of the masts on Seppings's system; *fig. 10* is the side view; *fig. 11*, the front view of a main-mast. *Fig. 12* is a horizontal section between A and B in *fig. 10*, showing the equal and parallel arrangement of the different parts which compose the mast. The section (*fig. 13*) shows the application of the wooden bolts in the centre-piece, and *fig. 14*, the same in the end pieces.

Fig. 15 shows the arrangement of the bolts lengthwise. *Fig. 16* exhibits the mast, and *fig. 17* is a screw-ring, for binding the different parts together. To secure an equality of force on both ends of the halves composing this ring when screwed together, little pieces of soft wood are placed between the lips.

When the mast is put together, the faces of the different parts are joined by pins of three inches in diameter and six inches long (*fig. 11*), and the four centre-pieces which form the spindle of the mast are fastened together diagonally by wooden bolts, *ed* (*figs. 13, 15*), an inch and a half thick, and at two feet distance from each other. Every couple of the outside pieces is fastened at *ih* at distances of two feet (*fig. 13*) with bolts, one and three-quarter inches thick. The whole mast is then nailed at *a, b*, and *c* (*figs. 13, 15*), with spikes, one and five-eighth inches thick, and at least one foot apart. At the ends of the masts (*fig. 14*) iron bolts, seven eighths of an inch thick, are used instead of the tree-nails, *ih* (*fig. 13*). The main-yards, as well as the masts, are composed of separate pieces; this does not diminish their firmness; on the contrary, their elasticity is thus increased. In order to put a mast into its place a scaffold is built on the upper deck, usually composed of two strong beams erected opposite each other, and their ends meeting at the top; these are supported by stout ropes on all sides. The mast is drawn up by a powerful tackle, and passed through the deck to its step on the keelson. One mast being raised, there is less difficulty with the rest. In many ship-yards there are permanent machines for raising by means of which the operation is performed with great ease (*pl. 31, fig. 3*).

The different spars are the following :

The *main-mast* (*pl. 9, fig. 27 H*), standing not in the centre of the ship, but towards the stern, at the distance from amidships of $7\frac{1}{2}$ or 8 lines to each foot of length; in the present case, therefore, about 10 feet 8 inches. It does not stand perpendicularly, but inclining backwards, in order to give more room forward to the sails, and to diminish their pressure on the bow. Its length is twice the breadth added to the depth of the ship (132 feet), and in frigates rather more. The greatest diameter is three inches for every ten feet in length ($3\frac{1}{2}$ feet). Everything pertaining to this mast receives the epithet *main*. The pieces around the spindle (*pl. 11, fig. 4 a*, and *fig. 5 c*) constitute the *mast-casing*.

The *main-top* (*fig. 1 N*). Although the tops are not spars, yet, as they are so closely connected with them, they must be described in this place. These are scaffolds around the upper part of the masts, *O*, consisting of four beams, called trestle-trees, covered with boards. Two of these timbers, *cc* (*fig. 6*), are placed lengthwise on each side of the mast, supported by cheeks, *b* (*figs. 4, 6*); the two others, *dd*, pass over these, crossing them fore and aft of the mast. On the trestle-trees a platform is erected, with holes for the rigging, the forward edge being curved and the after edge straight. It is surrounded by a railing with a covering of tarpaulin or network. The tops serve to support the top-mast rigging, and to hold the men who keep watch in them, or who have work to do there (*pl. 25, fig. 6*). They

were once often used during an engagement for the discharge of small arms, but this practice is now generally discontinued.

The *cap*, P (*pl. 11, figs. 1, 5 ee, 6 g*), is a strong thick block of wood, connected with the top of the mast by a square tenon, *c* (*fig. 4*); the forward end has a round hole, through which passes the foot of the topmast, *d* (*pl. 11, fig. 5, and e, fig. 6*).

The *main-top-mast* is the first prolongation of the main-mast, and is one and a half times the breadth of the ship in length (81 feet 8 inches). Its thickness follows the proportion of the mast. This mast is secured partly by the cap, and partly by the trestle-trees and *fid*, a block of wood placed through a hole in the heel, and resting on the trestle-trees, which prevents the mast from sliding down. At the heel of the top-mast is the *top-block*, through which the top-rope is rove in raising or lowering the mast.

The *main-top-mast cross-trees*, Q (*fig. 1*), form a light frame of four pieces of timber placed across the head of the top-mast, but without any top. Everything above these cross-trees is called *top-gallant* and *royal*.

The *main-top-gallant-mast* is the second prolongation of the main-mast, arranged in the same manner as the main-top-mast, and measuring three fifths of its length (48 feet). Ships of war usually carry top-gallant-masts of different lengths, which can be changed according to the weather. To the shorter one only one top-gallant-sail is attached; but the longer one, which is nearly as long as the top-mast, bears two sails, one over the other, the top-gallant-sail, *g*, and the royal, *j*.

The *main-truck*, R (*fig. 1*), is a circular piece of wood on the head of the top-gallant-mast, fitted with a sheave, to draw up flags and signals. The general term *head* is applied to the upper end of the masts and top-masts, reaching from the trestle-trees to the cap, and from the joining of the top-gallant-mast to the truck. The entire mast, with the long top-gallant-mast, is 248 feet in length.

The *main-yard* (*fig. 3 dd*). The term *yard* is applied to the spars which are hung across the masts with rigging, and to which the sails are attached. The length of the main-yard is twice and one-quarter the ship's breadth (122 feet 4 inches); the thickness is $2\frac{1}{4}$ inches for every ten feet in length; the diameter in this case, therefore, is 2 feet three inches, decreasing about one third at both ends, *dd*.

The *main-top-sail-yard* is $\frac{7}{16}$ of the main-yard (85 feet 7 inches); the *main-top-gallant-yard* is $\frac{4}{5}$ of the ship's breadth (43 feet 6 inches); and the *main-royal-yard* $\frac{1}{2}$ of the ship's breadth (27 feet 2 inches).

The *fore-mast*, G (*pl. 9, fig. 27*), stands at about one tenth of the ship's length aft of the stem (20 feet 6 inches); its length is nine tenths of the main-mast (118 feet 10 inches); the thickness is in the same proportion to the length as in the main-mast. In the top and the other arrangements the same system is employed, all the parts being designated by the term *fore*, as *fore-top*, *fore-sail*, &c. The *fore-top-mast* is one tenth shorter than the main-top-mast (72 feet long, and 1 foot 10 inches thick). The *fore-top-gallant-mast*, the second prolongation of the fore-mast, is five sevenths of the ship's breadth (39 feet). The *fore-yard* is double the ship's breadth

(108 feet 10 inches long, and 2 feet thick). The *fore-top-sail-yard* is once and one third the ship's breadth (72 feet 6 inches long, and 1 foot $3\frac{3}{4}$ inches thick). The *fore-top-gallant-yard* is seven tenths of the ship's breadth (36 feet long, and $9\frac{1}{2}$ inches thick), and the *fore-royal-yard* is in the same proportion to the fore-top-gallant-yard as the main-royal-yard to the main-top-gallant-yard (23 feet long, and $5\frac{1}{8}$ inches thick).

The *mizen-mast* (*pl. 9, fig. 27 F*) stands two thirds of the ship's breadth from the stern-post (36 feet 3 inches). It reaches only the first deck, where its heel is fastened, while the two other masts touch the keelson. All the parts connected with it have the name *mizen* applied to them. The breadth of the ship added to twice its depth gives the length of this mast (100 feet 5 inches long, and two feet 6 inches thick). The *mizen-top* has the same relation to this mast as in the two others. The *mizen-top-mast* is the first prolongation of the mizen-mast, its length being equal to the ship's breadth (54 feet long, and 1 foot $3\frac{1}{2}$ inches thick). The *mizen-top-gallant-mast* is the second prolongation of the mizen-mast, but is not used in all ships, and in that case the mizen-top-mast is lengthened out one third, and bears the mizen-truck. The length of the mizen-top-gallant-mast is equal to one half of the ship's breadth (27 feet long, and 7 inches thick). The *spanker-gaff* is a yard twice the ship's breadth in length (108 feet 10 inches). At the lower end it is three quarters of the thickness of the fore-yard, and one half its thickness at the upper end, and has the same length; hence the lower end is 1 foot 6 inches thick, the upper end 1 foot. It does not hang crosswise or horizontally like the other yards, but fore and aft; the thickest end is forward, and the other raised to the height of half the mizen-top-mast. It is secured to this mast under the *cross-jack-yard*. This yard bears no sail, and serves only to turn the mizen-top-sail, and stretch its lower ends. The length of the cross-jack-yard is one third the breadth of the ship (72 feet 6 inches long), like the fore-top-sail-yard, but its thickness is one quarter less, being only 1 foot 4 inches. The *mizen-top-sail-yard* has the length of the ship's breadth (54 feet, 5 inches), and the *mizen-top-gallant-yard*, which as well as the *mizen-royal-yard*, is not used in all vessels, is only two thirds as long as the mizen-top-sail-yard (36 feet inches long, and 6 inches thick).

The *bowsprit* is the mast which inclines over the bow of the ship, making an angle of 30° or 33° with the water-line. The step on which it rests is a piece of wood on the first deck, about one foot from the fore-mast. The part projecting over the bow is equal to the ship's breadth in length (54 feet 6 inches), but the entire mast is about one fifth longer, making 65 feet in the whole. Its greatest thickness is a mean between that of the main-mast and of the fore-mast (3 feet 3 inches). The forward end tapers off about one sixth, and has a cap.

The *jib-boom* is the prolongation of the bowsprit, and can be moved back and forth through the cap. The length of the jib-boom is equal to the ship's breadth (54 feet 6 inches), and its thickness is equal to one forty-eighth of its length (1 foot 1 inch).

The *spritsail-yard* is fastened on the bowsprit at about two thirds of its length, and has the same dimensions as the fore-top-sail-yard. There is

sometimes also a second yard at the jib-boom, which corresponds in size with the main-top-gallant-yard.

The *flag-staff* is the pole which bears the great national flag; it stands in a cap at the centre of the taffrail, inclining back in the direction of the stern-post. On its truck there is a sheave for the line by which the flag is hoisted and lowered. The flag-staff is one eighth longer, but one fifth less in diameter, than the main-top-gallant-yard.

The *fore-flag-staff* stands on the cap of the bowsprit, and is four fifths of the length, and three fourths of the thickness of the jib-boom. The top of the staff has a truck with a sheave to hoist the flag (*pl. 25, fig. 1*). In more recent times the main flag-staff has been set aside for various other arrangements, and the flag is raised by a tackle at the peak.

Besides the spars already mentioned there are several others; for example, the *studding-sail-yards*, used to lengthen the yards for the addition of studding sails, *studding booms*, &c.; but as they are only used in a light wind, they are generally kept with the spare spars.

2. RIGGING AND TACKLES. The rigging and tackles are so closely connected, that it will be more convenient to describe them together. By tackle-work we understand the blocks and fixtures through which the rigging is rove, and on which it is fastened.

A *block* (pulley) is a mechanical contrivance which is used in various ways on ship-board, consisting of a *shell* or *outside*, one or more *sheaves* or *wheels*, on which the rope turns, and a *pin* or *axle*, for the sheave. The diameter of the sheave is six times its thickness, and this varies with the size of the rope for which it is grooved on the circumference. In the centre of each of the outer sides of the block is a groove, around which passes a short rope, called a *strap*, or an iron band with a hook. The blocks have a variety of names. *Mortised blocks* are made of a single block of wood, mortised out to receive a sheave. All blocks are single, double, triple, or fourfold, according to the number of sheaves contained within the shell. There are some blocks which have no sheaves, used to receive the ends of ropes, as *hearts*, *bull's-eyes*, *dead-eyes*, &c. *Fig. 14^a* is a single strap-block, *fig. 13* a threefold cat-block, *fig. 15^b* a fourfold tackle-block, *fig. 11* a block for the arm of the main-yard, *fig. 14^b* a top-mast dead-eye; *fig. 16* a block with a swivel-hook; *fig. 12* a strapped twin block, and *fig. 15^a* a tail-block.

If a rope turn on only one sheave, so that the weight is at one end and the power at the other, the purchase is called a *whip*. Two single blocks form a *gun-tackle* purchase; a single and a double block form a *luff-tackle* purchase; *fig. 8* is a luff-tackle connected with a *runner*, which is a rope rove through a single block, hooked to a thimble in the eye of a pennant; *fig. 9* represents a winding-tackle rove in threefold blocks.

The tackles have different names, according to their place or their service. *Pl. 22, fig. 6*, shows the davits with a *lifting-tackle* drawing up a piece of cannon. The *quarter-tackles* hang on each side of the mast, and together with the yard-arm tackles serve to hoist up boats, provisions, and other heavy articles. The *yard-arm tackles* are fastened to the yard-arms, and

used only to lift articles on or over board. All the masts have quarter-tackles, and all the lower yards yard-arm tackles. There are still many other kinds of tackles. The removal of all the tackles, and consequently of all the sails and ropes, is called *unrigging*; the fitting of the same is *rigging*; and the mechanic who performs this service is a *rigger*.

The ropes, in regard to their length and thickness, are subject to determinate rules, of which we have a very accurate theory. The first principle in calculating their dimensions is, that a cubic inch of every rope either in a large or small ship should bear an equal strain. The thickness of the rope is not measured by the diameter, but by the circumference. The ropes are made in a rope-walk (*pl. 8, fig. 5*) of hemp, and on the coasts of the Mediterranean of the bark of the fig-tree and of the spikenard plant. The most slender ropes are called *lines*, and consist of six, nine, twelve, and fifteen yarns. The thicker ropes are called *hawasers*, and consist of at least eighteen yarns. The *strands*, usually three, are laid simply, for which reason all rope-work of this kind has been called *hawser-laid*. The larger ropes are composed of nine strands, or of three common ropes made into one. Ropes of this kind are called *cable-laid*. The whole rigging is divided into *standing* and *running*, and into *upper* and *lower*. The *standing rigging* is fastened at both ends of the ropes, and must be made firm in order not to stretch. The *running rigging* passes through blocks, and has a standing part where one end is made fast to some fixed point. The *upper rigging* is above the top, and does not run down to the deck. The *lower* is managed on the deck. The different ropes are represented on *pl. 11, fig. 1*, to which figure the numbers in the following description refer. The parts which belong to the standing rigging are designated by an asterisk.

The *main rigging (shrouds)*.* All the masts have *shrouds* on the right and left, which serve to secure them, and at the same time, by means of cross lines, called *ratlines*, form ladders, reaching to the mast heads. The shrouds are composed of more or fewer ropes, according to the size of the ship, and their position on the main, fore, or mizen-mast. The length of the ropes is twice and an eighth that of the mast to which they belong. The middle of the rope passes round the head of the mast, and the ends lead down, on the same side of the ship, to the chain-wales or tops, where they are made fast to certain blocks, called *dead-eyes*. Small ropes, called *lanyards*, are rove through the shroud-dead-eyes and through the futtock-dead-eyes (those that are secured to the timbers below the chain-wales), and are drawn taut by a tackle, serving to stretch the shrouds. *Pl. 23, fig. 4, pl. 8, fig. 3*, and *pl. 12, fig. 3*, show the manner of fastening the shrouds. *Pl. 11, fig. 7*, shows the dead-eyes, *ab*, with the lanyards for stretching the shrouds. The main rigging of the ship consists of six double ropes, each $280\frac{1}{2}$ feet long and 11 inches thick (*fig. 1*). The thickness is obtained by dividing the ship's breadth into five parts, and for every foot in one of these parts allowing a thickness of one inch.

The *futtock shrouds** consist of six short ropes, passing obliquely under the top, to hold the shrouds of the topmast, and fastened at one end to the upper part of the main rigging, from which they run to the edge of the top,

where they are joined to the top dead-eyes. These are not secured by chain links, like the futtock dead-eyes (*pl. 11, fig. 7*), but by short iron ties, as in *fig. 14 b*. One end of these ties passes through the border of the top and holds the dead-eyes for stretching the topmast rigging, and at the other end is a hole for the futtock-shrouds-rope. The top-mast shrouds also are furnished with ratlines and are used as ladders. The thickness is one third less than that of the main rigging, and consequently is $7\frac{1}{3}$ inches.

The *main stay** is a strong rope, leading forward, used to support the main-mast. Its length ($147\frac{1}{2}$ feet) is equal to twice the distance from the stem to the mizen-mast, and its thickness (22 inches) is double that of the shrouds. This rope passes from the foot of the fore-mast to the bottom of the main-top. Small ropes in the shape of a fan, called *crow's feet*, run from the upper end of the main-stay to the top, preventing the foot of the topsail from rubbing against the top. The main-stay is stretched by means of blocks.

The *main preventer stay** runs parallel with the main-stay, above it, and serving as a support. It has the same length and thickness as the main shrouds.

The *main jeers* (*fig. 1¹⁵*) are two ropes, serving to raise the main-yard. They are rove through the blocks which are fastened at the head of the mast and at the centre of the top. The length of the smaller rope is three times the ship's breadth ($162\frac{1}{2}$ feet), and its thickness is half an inch more than that of the mizen shrouds. The other rope is as long as the length and breadth of the ship taken together (259 feet 5 inches) and is thicker by $1\frac{1}{4}$ inches than the main shrouds ($12\frac{1}{4}$).

The *main lifts* (*fig. 1¹⁴*). The lifts are ropes attached to the yard arms, to support and move the yard. The main-lifts (those belonging to the main-yard) are as long as the length and breadth of the ship (259 feet 5 inches). *Fig. 3* shows the main-yard with its jeers: *aa*, are the lift blocks; *bb*, the lifts; *cc*, the straps of the jeers' blocks; *dd*, the main-yard; *d, d*, the yard-arms; *ee*, the arm-pieces; *g*, the rigging at the mast-head; *ff*, the jeers' blocks; *hh*, the futtock-shrouds; *ii*, the jeers' runners; *kk*, the lift-blocks under the cap. The studding-sail-boom-rings are also fastened on the yard-arms. *Pl. 10, fig. 4*, shows the topsail-yard with its lifts and the sail stretched.

The *main braces* (*pl. 11, fig. 1¹²*). *Braces* are ropes by which the yards are turned. Each brace of the main-yard is one and a half times the ship's length ($307\frac{1}{2}$ feet).

The *main backstays*.* The back-stays are intended to support the masts from aft, which the shrouds are too far forward to effect. They must be long and stout. The length of the main backstays is equal to the length and twice the breadth of the ship (314 feet 10 inches long and 11 inches thick).

The *main-top-gallant backstays** belong to the main-top-gallant mast, and are twice the length of the ship.

The *main-top-mast shrouds** support the top-mast on the right and left. They consist of six ropes on a side, which are $2\frac{1}{2}$ times the length of the top-mast (173 feet 4 inches), and of about one third less thickness than the main shrouds ($7\frac{3}{4}$ inches).

The *main-topmast stay** supports the topmast from forward, and runs from the fore-top to the main-top-gallant cross-trees, 205 feet long, and 11 inches thick. The *main-top-mast preventer-stay** runs over or under the stay, and parallel with it.

The *main-top halliard* is the rope which hoists the top-sail. The length of this doubled rope is $2\frac{1}{2}$ times the length of the ship ($462\frac{1}{2}$ feet). Ships of less than 60 guns have only single top-sail halliards.

The *main-top-rope* is a strong rope for raising or lowering the top-mast. Its length is six times the ship's breadth (325 feet), and its thickness is half an inch less than that of the shrouds.

The *main topsail lifts* support the main-topsail-yard in a horizontal position. Each of them is $1\frac{1}{3}$ times the length of the ship (273 feet).

The *main-topsail-braces* (fig. 1¹⁹) serve to turn the main-topsail-yard, and are $1\frac{1}{2}$ times the length of the ship ($307\frac{1}{2}$ feet).

The *main-top-gallant shrouds** consists of two-fold ropes, but frequently, as in the present case, without ratlines.

The *main-top-gallant stay** is one third larger than the main-top stay, and runs from the cross-trees of the foremast to the middle of the top-gallant mast.

The *main-top-gallant-sail halliard*, to raise the top-gallant-sail, is $1\frac{1}{2}$ times the length of the ship ($307\frac{1}{2}$ feet).

The *main-top-gallant lifts* are each double in length to the ship's breadth, and are rigged in the centre of the top-gallant mast.

The *main-top-gallant braces* (fig. 1²⁰) turn the top-gallant yards, and are each $307\frac{1}{2}$ feet long.

The *main-royal lifts* are rigged under the truck of the topmast, and are one third shorter than the top-gallant lifts, each of them 72 feet 2 inches in length.

The *main-royal braces* are of the same length as the top-gallant braces, but not so thick by one fifth. They are seldom made use of, as the royal turns at the same time with the top-gallant sail.

The *main guy* is a strong rope passing from the head of the mainmast to that of the foremast, supporting the main or hoisting tackle. Its length is $1\frac{1}{2}$ times the ship's breadth (81 feet 3 inches), and its thickness 11 inches. There are also quarter tackles arranged in the same manner, at each side of the mainmast and of the foremast. On each side of the main yard and of the fore-yard there is a *yard tackle*, whose guy is 84 feet 3 inches in length and $4\frac{1}{2}$ inches in thickness. The quarter tackles and yard tackle are usually connected with each other, the load being raised perpendicularly by the quarter tackle, and then brought overboard by the yard tackle, and *vice versa*.

The following ropes are fastened directly to the sails, serving to enlarge or diminish the surfaces exposed to the wind.

The *main tacks* (pl. 11, fig. 1^a) are ropes attached to the end of the mainsail, in order to haul it forward and down to the deck. Each of them is $3\frac{1}{2}$ times the ship's breadth in length (190 feet 5 inches), and three fourths of the thickness of the shrouds. The foresail is also furnished

with tacks (*fig. 1*³¹), but in the upper sails their place is supplied by the sheets.

The *main sheets* (*fig. 1*⁷) are fastened to the two lower ends of the sail, and serve to haul it aft. Their length is equal to the length and twice the breadth of the ship (313 feet 10 inches). The foresail, also, has such sheets (³⁰).

The *main bowlines* (¹¹) are attached to the leeches of the mainsail, to stretch them forward to the wind. The foresail has bowlines (³⁴), and all the yard sails (^{18, 24, 44, 47}).

The *main clewgarnets* (⁹). Clewgarnets are ropes by which the clews of the lower square sails are drawn up so that they hang from their yards like curtains, and can be furled and made fast.

The *clewlines* are the ropes by which the clews of the upper sails are drawn up to the yard. The clewgarnets of the mainsail are of the same length as the lifts. They are applied behind the sails. The clewlines are divided into *buntlines* (¹⁰), which draw upon the centre of the sail, the *leech-lines*, on the sides, and the *between-lines*, between those two points. Their length is one eighth less than the length of the ship (182 feet). The main-mast has also the clewlines of the main topsail, ¹⁶; its buntlines, ¹⁷; the clewlines of the main top-gallant sail, ²³; its sheets, ²²; its jeers, ²⁰; and the jeers of the main top-gallant sail, ²⁶, and its sheets, ²⁷.

The *reef lines* are short ropes passing through the holes in the reef bands, projecting alike on both sides of the sail. They serve to shorten the sail (*pl. 23, fig. 3*, where the sailors are reefing a topsail, shows these reef lines). The *reef tackle* is used to draw up the part of the sail which is to be reefed, and consists of a rope 280 feet long.

The following ropes, pertaining to the fore and mizen masts, have, in general, the same object as those of the main-mast, differing only in size, and consequently we shall merely briefly enumerate them, still referring to *pl. 11, fig. 1*.

The *fore shrouds** have only eight ropes. The *fore futtock shrouds** have five on each side. The *fore stay** goes to the bowsprit. The *fore preventer stay** stands above it. The *fore jeers*. The *fore lifts* ²⁰. The *fore braces* ³⁵. The *fore backstays**, one eighth shorter than the main backstays. The *fore top-gallant backstays**. The *fore topmast shrouds** with five ropes. The *foretop futtock-shroud ropes**, two on each side. The *fore top-gallant-mast shrouds** have two ropes on each side. The *fore topmast stay**. The *foretop-sail halliards*. The *foretop rope*. The *fore topsail lifts*, ³⁷, are 18 feet shorter than the main topsail lifts. The *foretopsail braces*, ⁴². The *fore top-gallant stay**. The *fore top-gallant halliards*. The *fore top-gallant lifts*, ⁴⁴. The *fore top-gallant braces*, ⁴⁸. The *fore royal braces*. The *clewlines*, ^{32, 39, 46, 51}. The *fore top-gallant jeers*, ⁴³. The *fore royal jeers*, ⁴⁹. The *fore top-gallant sheets*, ⁴⁵. The *fore royal sheets*, ⁵⁰. The *buntlines*, ^{33, 40}. The *tie* of the fore topsail.

The *mizen shrouds** consist of five ropes. The *mizen futtock shrouds**, three ropes. The *mizen stay** runs to the mainmast. The *mizen jeers**. The *mizen braces*, ³⁷. The *mizen lifts*, ⁵³. The *backstays** of the *mizen*

*topmast** and the *mizen top-gallant mast.** The *mizen topmast shrouds** consist of three ropes. The *mizen top-gallant futtock shrouds,** of two ropes on each side. The *mizen topmast stay.** The *mizen braces,*⁶⁰. The *mizen top-gallant shrouds,** two ropes. The *mizen top-gallant mast stay.** The *mizen top-gallant lifts,*⁶⁵. The *mizen top-gallant braces,*⁶⁵. The *mizen-top-sail sheets,*⁶⁶; the *clew-lines,*⁶⁷; *bowlines,*⁶⁸; *buntlines,*⁶⁸. The *jeers of the mizen top-gallant yard,*⁶¹; the *sheets,*⁶²; *clewlines,*⁶³; *bowlines,*⁶¹. The *mizen topsail tie,*⁶⁴. The *jeers of the mizen top-gallant sail,*⁶⁶; its *sheets,*⁶⁷; *clewlines,*⁶⁸. The *spanker vang,*⁷⁴, serve to turn the gaff to the wind. The *gaff halliard,*⁷¹, raises or lowers the gaff. The *lift of the spanker,*⁶⁹; the *sheets,*⁷²; and *clewgarnets,*⁷⁵. Only the main-sail, the fore-sail, the two topsails, and the mizen-top-sail have *reef-tackles,*⁷⁶, *reef-lines,* and *edge-lines,*⁷⁷. The *flags* and *streamers,*⁷⁸.

The *bowsprit* has the following rigging. The *bow stays** are formed of ropes passing from the end of the bowsprit and the jib-boom to the bows, where they are fastened. They secure the sides of the bowsprit. The *running stays** are two ropes passing over the bowsprit from the cap to the fore-castle, where they are fastened, forming a sort of baluster on each side of the bow. The *bobstay* is a strong rope, double and triple in large men-of-war, which fastens the bowsprit to the stem; its length is equal to the breadth and half the depth of the ship (66 feet 5 inches). The *lifts of the sprit-sail yard,*², are equal in length to the breadth and half length of the ship (156 feet 11 inches). The *sprit-sail braces* are equal to the length and twice the breadth of the ship (313 feet 10 inches). The *tacks of the jib*³, its *sheets*⁴, and its *jeers*⁵, complete the rigging of the bowsprit.

The *staysails* have three ropes: the *halliards*, for drawing them up; the *downhaul*, the use of which is denoted by its name; and the *sheets*, to stretch the lower corner right or left.

The *foot ropes*, or *horses*, extend along the yards and bowsprit, on which the men stand when reefing or furling. *Pl. 23, fig. 3.*

3. THE SAILS. The object of the sails is to receive the wind and thus propel the ship. Their arrangement now forms a system of great ingenuity, giving the appropriate position to them, in all cases, with rapidity and certainty. They are made of very thick hempen cloth, manufactured for the purpose, with three different degrees of strength, so that the strongest may be used for the lower sails. Indeed, the upper sails are sometimes made of linen or cotton. A sail is composed of several breadths of sail cloth, sewed lengthwise with strong tarred sail-yarn. The whole work is done on the sail-bench, by a part of the ship's company, called sailmakers, as in *pl. 8, fig. 6*. The borders of the sail, called leeches, at the sides are surrounded with a fine, light-spun rope, called *bolt-rope*. At the corners, and wherever ropes are attached for stretching the sails, small iron rings are inserted. A row of holes is made on the head of the sails, through which short lines are passed, bending the sail to the yard. Here, and wherever holes are made for reef-lines, the sail-cloth is doubled. The side of the sail towards the stern of the ship is called the inner side. In order to fasten the yards, rings of rope with knobs are used (*pl. 11, fig. 30*).

The size, form, and position of the sails vary to a great degree. The *yard-sails* are the most common and the most important; they are hung upon the yards, and form a quadrangle which is somewhat smaller above than below. Next to these are the *staysails*, which form an irregular quadrangle almost in the shape of a triangle. They are drawn up and down on the stays by small rope-rings or wooden hoops. A large ship-of-war often carries thirty-eight sails, and sometimes more, but they are never all unfurled together, as in that case one would interfere with another.

The *main-sail* (*pl. 11, fig. 1 a*) is 97 feet wide at the foot, 93 feet 10 inches at the head, and 45 feet 6 inches high, and contains 4305 square feet. The *main topsail*, *d*, is 96 feet wide at the foot, 60 feet 9 inches at the head, 60 feet 9 inches high, and contains 4750 square feet. The *main top-gallant sail*, *g* (also *pl. 10, fig. 4*), is 63 feet 3 inches wide at the foot, 43 feet 6 inches at the head, 32 feet 6 inches in height, and contains 3761 square feet. The *main royal* (*pl. 11, fig. 1 j*) bears the same proportion to the top-gallant sail as that does to the topsail. Sometimes two small staysails in addition are attached to each side of the masts. The *main staysail* is triangular and hangs upon the main stay. The *main-top staysail* is carried over the former on the main-topmast stay. The *main top-gallant staysail* is smaller than the former. The *main-top studding-sails* are fastened to the studding-sail booms on each side of the vessel, which are extended from the two arms of the main yard. The *main top-gallant studding-sails* are hung to the yard on each side of the main top-gallant sail, their lower ends being secured to the main-topmast studding-sail-booms. In very calm weather, *water-sails* are stretched under the maintop-studding-sails. They are seldom used, as they take the wind out of the fore-studding-sails.

The *foresail* (*pl. 11, fig. 1 b*) is 81 feet broad at the foot, 78 feet 6 inches at the head, 40 feet high, and has 3210 square feet. It is arranged in the same manner as the yard sails on the main mast. The *fore topsail* (*e*) is 82 feet broad at the foot, 51 feet 6 inches at the head, 53 feet 6 inches high, and has 3577 square feet. The *fore top-gallant sail* (*h*) is 54 feet 9 inches wide at the foot, 38 feet 6 inches at the head, 28 feet 8 inches high, and has 1343 square feet. The *fore royal* (*k*) is smaller than the former; the *fore staysail* (*n*) is triangular; the *jib* (*m*) is somewhat smaller; the *flying jib* (*o*) is hung on the stay passing down from the foretop cross-trees. On the foremast, there are also the *fore studding-sails*, the *fore topmast studding-sails*, and the *fore top-gallant studding-sails*. The *spritsail* is stretched under the bowsprit on the spritsail yard, its sheets being secured on the fore quarters.

The *mizen-sail*, *c*, is a gaff sail, called the *spanker*, 62 feet 6 inches broad at the foot, 47 feet at the top, forward 32 feet 6 inches high, and aft 63 feet 6 inches high, and has 2,457 square feet. This sail was formerly made broader, but thus being awkward to manage, its size was reduced. The *mizen top-sail*, *f*, is 63 feet 6 inches broad at the foot, 41 feet 9 inches at the head, 43 feet 6 inches high, and has 2,300 square feet. The *mizen top-gallant-sail*, *i*, is 43 feet 2 inches broad at the foot, 32 feet 6 inches broad at the head, 22 feet high, and has 836 square feet. The *mizen royal*, *l*,

The *mizen studding-sails* are fastened to the mizen yard-arms. The *mizen gaff-sail*, on the top-mast, is similar to the spanker, but is seldom used.

Besides the parts already described, we find in (*pl. 11, fig. 1*), A, the boat hanging to the scantles; AA, the small boat; BB, the stern galleries; C, the rudder; E, the hammocks between the nettings; F, the first battery; G, the second battery; H, the third battery; I, the entrance port; K, the davits, with anchors; LL, the hawse-holes, with the chain-cables; M, the life-buoy; T, the national flag; UUU, straps or hangers, with rings on the top, to which the lower yards are hung.

d. **FLAGS AND PENNANTS.** In the outfit of a ship we reckon the *flags*, *pennants*, *signals*, and *streamers*, which are made of a thin woollen stuff called *bunting*. *Flags* are long quadrangular banners, which are drawn up at the peak of the gaff, or at the mast-head, with the shorter sides perpendicular. One side is bound with linen, and has a small rope attached to it with a loop, to which is fastened the line for hoisting the flag. The flags of men-of-war are at least from four to five yards high, and about six yards long. Each nation has its own flag, which is displayed at the peak of the gaff, while a smaller one, called the *jack*, waves on a jack-staff erected at the end of the bowsprit. The flag at the mast-head is a sign that the admiral is on board. His flag is displayed at the main top-gallant-mast. The vice-admiral carries his flag at the fore top-gallant-mast, and the rear-admiral at the head of the mizen top-gallant-mast. But if they have the command of a particular squadron, their flags are then displayed on the top of the main-mast. When the admiral enters upon his command, his flag is hoisted (*pl. 24, fig. 3*) with great ceremony, accompanied with salutes of cannon and martial music; all the vessels in the harbor display their colors, and fire salutes to the admiral's flag. When the king or emperor is on board, the royal standard is displayed from the head of the main top-gallant-mast.

The *pennants* form a triangle, the length of which is equal to that of the flag, but the breadth not quite half the height of the flag. *Pennants* are of two kinds. The first (*pl. 10, fig. 8*) has its smaller end slit up about two thirds of its length; the others run to a point (*fig. 9*). The last are hoisted in the same manner as the flags; the first are fastened at the broad end to an inch-staff, which is connected by a loop to the line. The broad pennant is the sign of a commodore or captain who is in command of a special squadron.

A *streamer* (*fig. 3*, at the mast-head) is six inches broad at the larger end, and is fastened to a staff at the mast-head. It is divided at about one third of its length from the small end, and in large ships is 15 or 20 yards long, and sometimes more. The streamer displayed at the top of the main-mast is the sign that the captain is in command of the ship.

The *vane* (*fig. 7*) is very small and of different lengths. It is stretched at one end on a piece of wood, which turns on an iron spindle, showing the direction of the wind. Vanes are used chiefly by merchantmen. Ships of war carry not only their own flags, but those of other nations; and in war

merchantmen do the same, in order to deceive the enemy. On coming into port, a ship displays its flag at the peak (*pl. 25, fig. 3*). A conquered ship of war surrenders by striking its flag (*fig. 4*). When a general salute is given all the sails are furled, the flags are displayed, and the sailors are paraded on the yards; at the same time a salute is fired by the cannon. *Pl. 25, fig. 1*, is an English ship of the line of 120 guns. On occasions of ceremony, the ships are dressed with flags. *Fig. 2* is a French ship of the line of 120 guns. Flags are hung on all the masts, stays, shrouds, and other rigging. Etiquette is here observed in the disposition of the flags and pennants, the place of each being determined by the relation with the power which it represents. The flag of the royal house is placed at the head of the main-top-gallant-mast, and that of friendly powers at the heads of the fore and mizen-top-gallant-masts. The more unfriendly the relations with foreign states, the lower is the position of their flags. The least honorable place of all is over the cutwater. The flags in *pl. 13* are designated by colors on the lower border of the plate. The names of the countries to which they respectively belong will be found in the Table of Contents.

C. *Equipment of Ships.*

The equipment of a ship includes a great variety of articles which, though necessary to its service, are not comprised in its construction.

a. THE ANCHORS. One of the most important parts of the equipment of a ship is the *anchor*, with its *cable*, serving to hold the ship in the same place, so that it can be moved neither by the wind, the waves, nor the tide. *Pl. 10, figs. 14 to 29*, shows a variety of different anchors and their separate parts. The anchor is a large iron instrument, which consists chiefly of a *shank*, and two *arms* which terminate in *flukes*. One of these (*fig. 20*), as soon as the anchor touches, strikes into the ground, and, by means of the cable connecting the ship with the anchor, the ship is held fast.

The parts of the anchor are the *shank*, A (*fig. 19*), the length of which, in proportion to its thickness, is as 18 or 16 to 1. The *arms*, DD, are two hooks which project in opposite directions from the lower end of the shank, called the *crown*, e (*fig. 14*). The *flukes* or *palms* are broad triangular pieces, pointed at the ends, which are forged into the extremities of the arms, and well adapted to take hold of the bottom. The *ring*, G, which passes through the eye, E, serves to hold the cable. The *stock*, A (*fig. 18*), consists of two beams of wood joined together by iron bands and rivets, inclosing the shank, B, below the ring, C, and standing at right angles to the plane of the arms. In constructing the anchor, the shank was formerly forged out of a single piece; later rods of iron were welded together (*fig. 17*, section); and finally it received the form as in C (*fig. 16*), the projections, *a* and *b*, being added, and the hole for the ring made at A. Places were arranged for the arms, which were forged separately, and then welded on. In this process three fires were necessary, one for the shank, and one for each arm; the forging was done on an anvil with an octagonal hole, through which the arms were passed in order to give the anchor the shape as in *fig. 14*. The piece, C (*fig. 15*), was added to the arm, B, and the fluke,

A, to each arm. According to the modern fashion, the arms of the anchor have nearly a crescent form (*fig. 19*); the shank is forged of such a length, that it can be split and turned at H and B to each side, in order to form the upper surface of the arms; an iron wedge is then inserted at the crown, and a band laid on, which forms the lower surface of the arms, D. After all is welded together, the flukes, C, are attached. The stock serves to prevent the anchor from falling on the flat side, in which case the flukes would not sink into the ground, nor gain any hold. It also serves to turn the anchor if it falls flat, as the waves and the draught of the cable will turn the stock, which, being lighter than the water, and presenting a broad surface to it, will always remain partially floating, and the draught of the cable will then force the flukes into the ground.

The weight of the anchor is determined by the size of the ship. Each ship has several anchors. A ship of the line of 120 guns (*pl. 11, fig. 1*) has four anchors of 9000 pounds' weight, one of 8000, two of 2700, one of 2500, and one of 1200. They all have their place at the forward part of the ship, partly on the outside. The *sheet anchor* is the heaviest, and is only used in case of a storm. A smaller sheet anchor is stowed on the lower deck and is only used on great emergencies. The next is the *bow anchor*, which lies on the larboard side of the bows. The *stream anchor* is on the starboard side. The *kedges* are used chiefly for warping a vessel from one place to another in a harbor or river. Besides these there are small anchors with three or four arms (*pl. 10, fig. 26*), called *grapnels*. *Fig. 27* is Stuart's grapnel. They are used to secure boats. There is another kind called *grappling irons* (*fig. 28*), used with a chain instead of a rope, and serving to grapple with an enemy's vessel and for other purposes.

The different uses to which anchors are applied give rise to a variety of expressions. For example, when the anchorage is bad, a second anchor is connected with the first, this arrangement being termed *backing the anchor* (*fig. 29*). Of the two anchors with which a ship is moored, one is called the *shore anchor* and the other the *sea anchor*. We have also the *flood* or the *ebb*, the *weather* or the *lee* anchors, according to their position. In order to ascertain the exact place where the anchor lies, a rope is attached to the ring, before casting anchor, with a floating block of wood, called a *buoy*, at the other end. Pieces of cork (*pl. 10, fig. 32*) and casks (*fig. 31*) laid over with ropes are also used for buoys. A peculiar kind of anchor, called from its shape the *mushroom* anchor, is shown in *fig. 33*. It has neither arms nor flukes, but a trencher-formed foot, sharply curving upwards. It also has no stock, as the foot, A, is always ready to take hold, and is so heavy that the shank, B, never turns over to the ground. In harbors and roads, permanent anchors are used, to which the ships are fastened instead of casting their own anchors. The *forked anchors* (*fig. 21*) are used for this purpose. They consist of a short shank, A, with the ring, B, for the cable, and two parallel arms, C and C'. *Fig. 22* is a *shovel anchor*, the shank of which has the stock, D, and the ring, C, at one end, and the broad, heavy shovel, A, at the other. The *large hook-anchor* (*fig. 23*) serves to hold several small vessels. It has

the fluke D, with which it strikes deep into the ground, the knob A, and the holes B and C, for making fast the cable. The *blocks* (*fig. 24* and *fig. 25*), the last with a notch for the fluke, are used to lay over the fluke after the anchor has been sunk, and to hold it down. To the cables of such permanent anchors are fastened large buoys, to which the vessels are moored.

The ropes for the anchors are called *cables*, and take their name from the anchors with which they are used, as the *sheet-cables*, *bower-cables*, *stream-cables*, and so forth. Besides these there are two *spare cables*. The cables are made of the same materials and in the same manner as the common ropes, and as they have to hold such a great burden often against an immense pressure, are constructed of an extraordinary thickness. They are composed of three smaller ropes, of three strands each, and sometimes of four ropes. They often have a hollow space in the centre, called the *heart*, filled with a light-spun rope. The thickness of the cable is half an inch for each foot of the ship's breadth, consequently in *pl. 11, fig. 1*, $27\frac{1}{2}$ inches. The length is usually from 120 to 150 fathoms, and they are generally double the weight of the anchor to which they are attached. If a longer cable is used, it is made by splicing two ropes together (*pl. 10, fig. 30*). In the first half of the figure the splicing is finished, in the other the work is going on, the strands not being braided in. The cables for kedges are 125 fathoms in length, and often only 120. This last measure is called a *cable's length*, and is used to measure short distances at sea. As the cable is not wound on the capstan or windlass, small ropes called *messengers* (*pl. 11, fig. 15 c*) are attached to it, which pass round the windlass, and the cable is thus drawn in without bending.

Instead of hempen cables, chain cables are now extensively used. The ship, *fig. 1*, has two chain cables of 180 fathoms, four rope cables of 120 fathoms, two smaller ones of the same length, and two three-stranded *hawfers* also of the same length.

THE SHIP'S BOATS. Every ship is provided with a number of *boats* of different sizes, which are used for such services as cannot be performed by the ship itself, on account of its size and weight or the shallowness of the water. The boats are distinguished from those in common use on inland rivers by not having broad and flat bottoms, but a sharp keel with side timbers arranged ship-fashion. An iron ring is attached to the stern and prow, to which is hung the tackle for hoisting or lowering. They are propelled by oars, but can also be fitted up with masts and sails. Each boat has from four to sixteen cross-benches, according to its size, for the rowers. Except those which are used to fasten the sails, and which are secured with iron bands, the benches are loose, and are removed to take in lading. At every bench are two *thole-pins* for the oars, called *row-locks*. The smaller boats are called *yawls*. The smaller merchantmen have only a *long-boat*, a *yawl*, and the captain's *gig* or *jolly boat*. The sails are fore and aft sails (*pl. 10, fig. 6*), standing at two thirds the distance from the prow. A staysail is also sometimes used, and a jib rigged on a boom. The boats are used in heaving the anchor. The buoy rope of the anchor

is passed through a pulley on the prow of the boat, and with a tackle hooked to the ring at the stern, is drawn in, or wound up by a small windlass on the bow, until the anchor is loose, when it is hove up by the capstan of the ship. The Portuguese and Spaniards have a kind of boat different from those in common use, which is sharper forward and broader in the stern. The *yawl* is lighter and narrower than the long boat, and when it is used with sails has two masts with spritsails (*fig. 5*). It is employed to bring the crew on board and for other light work. The *captain's gig* is still lighter, and is built in an ornamental style. During the voyage the long-boat is kept on deck, over the main hatch, where it rests on *boat-chocks*. The yawl is placed in it. The captain's gig hangs at the stern on the outside, on two davits fitted with tackles. Large men-of-war have six or eight or more boats and cutters of different kinds. Among them is the captain's *barge*, or if there is an admiral the admiral's *barge*, each with eight or ten oar benches. They are not the largest boats, but are built in a superior style. A man-of-war's boats usually have fore and aft sails or spritsails, but are sometimes fully rigged, like a lugger or schooner. *Pl. 4, fig. 7*, is the cutter of a French frigate; *fig. 8*, the cutter of a French ship of the line; and *fig. 9*, the cutter of an English ship of the line.

3. THE GUNS. All ships of war carry *guns* of greater or less weight; merchantmen, also, usually have two or three, and they should by all means have one at least for firing signals of distress. The heavy guns of a man-of-war consist of *cannon*, *carronades*, *swivels*, and *mortars*. The cannon are, for the most part, of a very heavy calibre. (In regard to the form of guns, the necessary information will be found in Military Sciences, p. 118, or p. 594 of this vol.) Those of the heaviest calibre are the most common. Large men-of-war have 36-pounders, 24-pounders, 18-pounders, and, rarely, 48-pounders; but recently 48- and 56-pounder *Paixhans* have been introduced. Although the guns of a ship are similar to those of the land artillery, their *carriages* are very different. Their form and construction are shown in *pl. 21, figs. 4, 5*, and *pl. 22, figs. 3, 4*. The carriages consist of two strong oak beams, called the *cheeks*, standing on two axle-trees with block-wheels, called *trucks*, of which the fore wheels are somewhat the higher. The cheeks are connected by a cross-piece which is cut out above, so that the muzzle of the gun can be lowered. The cheeks are held together by numerous key-bolts. A ring-bolt is attached to the outside of each cheek for the breech-rope of the cannon, and two eye-bolts for the side tackle. Grooves are cut in the upper part of the cheeks, to which the trunnions of the cannon are fastened with spring-bolts. The notches on the hind end of the cheeks serve as props for the handspikes when the cannon is to be pointed. At the centre of the hind axle-tree is an eye-bolt for the train tackle.

The gun-carriages in the French navy have a foundation frame consisting of two timbers, at the hind end of which is a ring to which the train-tackle is attached. The breech-rope does not pass through the ring-bolts in the cheeks, so that it can be laid back upon the breech of the gun, but through two holes in the cheeks. The French, moreover, use the standing-

carriage, which has no wheels (*pl. 22, fig. 3*), but is made of two thick frames bolted together, and with grooves for the trunnions. The gun is pointed by means of a screw, instead of quoins. On the cheeks are two ring-bolts to which the breech-rope is fastened, thus greatly diminishing the recoil. In galleys, feluccas, gun-boats, and other small vessels, which are propelled by oars, the arrangement is different, as these can always be so turned as to bring the object fired at within range.

The weight of a ship's guns and their carriages is as follows : iron 48-pounders, 9000 pounds ; brass do., 7900 pounds ; 36-pounders, 7450 and 6860 pounds ; 24-pounders, 5382 and 4846. The carriage of a 48-pounder weighs 1500 pounds ; of a 36-pounder, 1200 to 1300 pounds ; of a 24-pounder, 900 to 1000 pounds ; and of an 18-pounder, 740 to 800 pounds. A 48-pounder is served by 16 men ; a 36-pounder by 14 men ; a 24-pounder by 10 men ; and an 18-pounder by 9 men.

The guns of a man-of-war usually project from the port-holes about two thirds of their length, the carriage touching the side, but in stormy weather they are drawn back and the port-holes are closed. This is more particularly the case with the guns of the lower deck. The guns are moved by different ropes : the breech-rope, the train-tackle, and the side-tackle. The *breech-rope* is a short rope, either laid around the breech of the gun or drawn through a hole in it, then drawn through the rings on the cheeks of the carriage, and hooked at the ends into strong rings on the ship's side. It serves to prevent too great a recoil after the discharge of the gun, and also to keep it from rolling back when the wind beats the ship towards the opposite side. It must be long enough for the gun to be drawn so far back that its mouth will be two feet from the ship's side, for the sake of loading it conveniently. When the cannon is in the port-hole, the breech-rope is laid upon both sides of it, and bound with cable yarn. The *train-tackles* (*pl. 10, fig. 1st*) are used to draw the gun backwards. One of its blocks is fastened at the centre of the hind axle-tree, and the other to a ring attached to the deck. Guns of a large calibre have a double tackle (*fig. 2nd*). The *side-tackle* is used to draw the cannon to the ship's side, and to project their muzzles through the port-holes. It is hooked to the rings of the two cheeks of the carriage, and to those on each side of the port-holes (*pl. 22, fig. 4*). For pointing and elevating the guns handspikes are used, and for the side direction, crow-bars with claws. If there are no elevating screws, two quoins are made use of. When not in action, the guns must be securely fastened, as, if they get loose during the rolling of the ship, they do much damage, and may in some cases cause the loss of the vessel. In order to secure the heavy cannon on the lower deck, they are drawn back and the quoins taken out, which raises their muzzles to the upper part of the port-hole ; a rope is placed round these, by which they are secured to a ring over the port-hole ; the train tackles are hooked to the same ring, and to a strop which passes round the breech, and drawn taut ; the side-ropes are also drawn taut, and the remaining part of them wound round the breech and through the ring on the ship's side ; they are then fastened together before the gun-carriage with another rope, and finally a wedge is

placed under the hind wheels. A thick rope is also extended along the whole inner side of the ship through strong rings, which are on the deck between the guns, passing over the hooks on each side of the port-holes, and behind around the carriages, on which it is stretched taut at both ends.

The guns are shotted with a *rammer* (*pl. 11, fig. 36*), consisting of a stout rope's end, with a *swab* at one end for sponging the gun, and at the other a thick wooden knob. There are also rammers and swabs with wooden stocks (*pl. 11, fig. 33*), and each in a separate piece; but those of ropes' ends are more convenient. *Figs. 37, 38* are the *worms* for extracting a ball from the cannon. The first is like that used for a musket; the second serves also to clean the barrel. The *gun-ladle* (*fig. 39*) is used when the cannon is loaded with loose powder instead of cartridges, to convey the powder to the butt-end of the barrel. The *cartridges* are woollen bags filled with powder, and often also containing a ball (see *Military Pyrotechny*, p. 135, or p. 611 of this volume). They are kept in a wooden chest on the deck, called the *cartridge-chest*. The ball is prevented from rolling forwards by wadding of tow or untwisted rope. The cartridges are pierced with a *priming-wire*, to enable the priming to reach the powder. This is contained in the *powder-horn* (*fig. 45*), which is borne by one of the men during an action, and is usually hung over the port-hole (*pl. 22, fig. 4*). Quick matches are often used in firing, and in that case the powder-horn is filled with pulverized gunpowder. When the guns are fitted with *percussion locks* the powder-horn is of course unnecessary, as well as the matches. The *apron* is a leaden plate placed over the *vent* of the loaded cannon, and is removed only at the moment of firing. Except during an engagement the vent is plugged up with tow, and the apron bound down upon it; when percussion locks are used, a case is placed over the lock instead of the apron. As the guns become very much heated by continued firing, a *cooler* filled with cold water stands by the side of each, to cool down the inside of the barrel with a swab, and the outside with a mop made of twisted ropes. An instrument called the *visitor* (*pl. 11, fig. 40*) is used to inspect the inside of the barrel; it consists of the rod, *a*, with a trigger and the ring, *cc*, which is attached to a second rod, *b*, over the first. If the instrument is pushed into the barrel without the ring the trigger springs into the cavity, if any exists; the ring is next inserted as far as possible without force, and then, without displacing the ring, the instrument is withdrawn, and thus the depth of the cavity may be ascertained.

In shooting, *balls* are generally used in cannon; these are the most effective; *canister shot* and *grape shot* are also used for various purposes. The balls are kept partly in the *shot-room* near the pump-well, and partly on the *shot-rack* (*pl. 21, fig. 5*) formed of slips of wood on the right and left of the cannon. Canister-shot are small balls several of which are fired at the same time (see *Military Pyrotechny*). They are generally inclosed in bags of strong ticking, like grape-shot, with a circular wooden bottom (*pl. 11, figs. 48, 49*). Besides this kind of shot there are *chain-shot* (*fig. 41^b*), *bar-shot* (*fig. 41^a*), *bolt-shot* (*fig. 42*), *club-shot* (*fig. 43*), *sliding-shot* (*fig. 44*), which are intended chiefly to destroy the rigging and sails of the enemy;

they are, however, little used, as, on account of their irregular shape, they cannot be fired with accuracy, and seldom hit the mark. *Pl. 21, fig. 5*, shows a starboard battery furnished with guns, as it appears when the ship is cleared in day-time; *fig. 4* shows a starboard battery, at night, when the sailors are asleep in their hammocks, which in the daytime are stowed away in the netting (*fig. 3*, right hand above).

Carronades are a kind of ordnance which take their name from the Carron iron-works in Scotland, where they were first made. They were first used by the British navy in the revolutionary war with North America. The carronades have a chamber for the powder like mortars. They discharge larger shot than the common cannon, which are much longer and heavier, and carry further with a more certain aim. They are now used but seldom, as Paixhans' mortars are far superior. (See Projectiles, in Military Sciences.) They are of various sizes and calibres. A 68-pounder weighs 3600 to 3900 pounds; a 44-pounder weighs 2227 pounds; a 32-pounder, 1714; and there are also 24-pounders, 18-pounders, and 12-pounders. Carronades (*pl. 22, fig. 3*) have a projection at the breech, through which a stout bolt passes, and on this the barrel is moved up and down. The breech tackle is rigged through a kind of ring in its upper part, and the direction given by means of a screw. The carriage turns with its frame upon a heavy bolt passing through the frame and the beam of the deck, and consequently carronades suffer no recoil, and do not require train-tackle or side-tackle. On account of the shortness of the tube, it can be loaded on the outside of the port-hole. *Fig. 3* shows a carronade on the middle deck; *pl. 21, fig. 1*, is the aft starboard carronade battery, with the officer on duty. *Fig. 3* shows the middle deck on the starboard side, with the main hatch, the long boat standing on the boat-chocks, the carronade battery, and the hammocks stowed in the nettings under the netting sails.

Swivels are small $1\frac{1}{2}$ to 2 pound cannon with a movable frame consisting of a thick wooden beam, to the upper part of which a pair of cheeks are attached, which support the trunnions of the gun. The beam passes through a round hole in a timber fastened on the ship's side, and stands in an iron box on the deck. Small swivels are called *swans' necks*, because they are hung to a strong curved iron fork. They are usually loaded with several musket balls and small shot. *Blunderbusses* are guns of a wide bore, which discharge grenades. Swans'-necks and blunderbusses are used on the tops. Other weapons are *muskets*, *pistols*, *pikes*, *hangers*, and *pole-axes*. Hangers are adapted both to cut and thrust; they are short, similar to cutlasses, and usually without a sheath. Pole-axes are like the common axe in front, but on the other side they have a stout point, three or four inches long (*pl. 11, fig. 20*).

Mortars are used on board ship for projectiles. These, with their blocks, have been already described under the head of Military Sciences. The mortars stand on the fore quarters of the upper deck; the deck beams must be strongly propped up for them, as they exercise a great downward pressure when they are discharged. Rödning proposes that mortars should be placed on a strong floor of rope-work, the elasticity of which would diminish the

pressure. The bombs which are thrown from mortars (*fig. 46*, view; *fig. 47*, section), are hollow iron balls filled with powder, with an opening on the top in which the wooden fuse filled with a slow match is placed. As soon as the mortar is discharged, the fuse takes fire, and continues to burn until the bomb falls. By that time it has kindled the charge of the bomb, which then explodes with great violence, destroying everything within its reach.

Men-of-war have great occasion for gunpowder, which, besides being used in action, is wanted for salutes and exercises, as well as for burning in the hold to purify the air. Merchant-ships also generally carry a considerable quantity of powder. In ships of war the powder is kept in a close apartment, called the *magazine*, of which ships of more than 60 guns have two. They are situated forward and aft, in the lowest part of the hold, and consequently deep under water, where they are usually safe from damage by cannon-balls and other accidents of the kind. They are separated by partitions from the other parts of the ship, the walls being often covered with sheet lead. They are lighted by a lantern, which stands in a basin lined with lead and filled with water. The sides are of horn and surrounded with a wire netting. The light is let in through an opening in the side. The powder is kept partly loose in kegs, and partly in cartridges and canisters. The door is constantly locked, and no one but the master-at-arms has the key. In merchant vessels the powder is kept in the *run*, the after part of the hold, and is under the charge of the mate.

4. PROVISIONING THE SHIP. The provisioning of a ship, in regard to quantity, is determined by the number of its crew, the length of the voyage, the climate and productions of the country to which it is to sail, and also by its facilities for keeping its stores without injury. Delays during the voyage must always be taken into account, and consequently a supply of provisions must be secured for a longer time than the estimated length of the voyage. Even for the shortest voyage, provisions should be taken for not less than three months. Especially there must be a sufficient supply of fresh water, biscuit, dry vegetables, salt meat, and dried and salted fish. The quality of the provisions depends on the habits of the sailors. The English, for example, have fine wheaten biscuit, of excellent taste, while the biscuit of the Dutch is made of crushed rye, coarse and black as peat-turf; the English sailors are supplied with beer, butter, and plenty of meat; the Dutch, the Germans, and other northern nations, use a great deal of beer and butter and less meat, but, on the contrary, more flour and vegetables, as well as dried fish. Among the southern nations, wine is dealt out every day, but instead of butter they make use of anchovies, cheese, olive oil, and onions. The officers, both of men-of-war and merchantmen, have better fare, including poultry and milk, and also good wines and spirits. The fresh water is kept in large oaken casks with iron hoops standing in the hold. As fresh water is one of the prime necessities of life and is very precious at sea, great care is taken for its preservation and economical expenditure. In men-of-war it is under the charge of an officer, and in merchantmen of the mate, who alone have the key of the water-room. The rest of the provisions are kept in sacks, chests, and

barrels, and are under the charge of the steward. In merchantmen they are kept in the run, in care of the mate.

5. OTHER NECESSARIES ON SHIPBOARD. In men-of-war a special supply of provisions is laid in for the sick, as well as a store of medicines, surgical instruments, &c., under the charge of a head surgeon and several surgeon's mates. A room with windows on the fore part of the upper deck is usually provided in English ships of the line for the reception of the sick, called the *sick bay*. Large fleets and squadrons have special hospital ships, for the accommodation of the sick whose diseases are dangerous. Merchantmen have no systematic arrangements for the sick, and only East India vessels and the largest packet ships carry a physician. But every captain has a small chest of medicines, with a book of directions for their use, and he thus takes the place of the physician in case of need.

In long voyages a supply of linen and clothing is taken in, in order to furnish the sailors, if necessary. This, however, depends on the pleasure of the captain, and, strictly speaking, does not belong to the equipment.

Among important parts of the equipment, we have finally to mention the various instruments and apparatus necessary to direct the course of the ship. The *compass* resembles the common surveyor's compass, but is hung in a peculiar frame called *gimbals*, so that the needle and the circle of degrees shall always be as nearly horizontal as possible. The *log* (*pl.* 23, *fig.* 6) serves to measure the velocity of a vessel through the water. It is a three-cornered piece of board called the *chip*, to which the *logline*, running upon a *reel*, is attached by three legs, two of which are knotted through a hole in two corners, while the third draws out at pleasure. When the log is thrown into the water, it stands almost perpendicular, and at that moment a *half-minute glass* is turned. As soon as the glass has run out, the line, which is marked off into proportional spaces, called *knots*, and running freely, is suddenly stopped; the loose leg then draws out, and the log floats flat on the water, and presenting no further resistance is drawn on board; the number of knots is counted; and they each being in the same proportion to a mile that a half minute is to an hour (1-120), the velocity of the ship is easily determined. The *lead* is a heavy weight attached to a line, in order to measure the depth of the sea in certain places. When the lead is to be thrown (*fig.* 4), the ship is either hove to or her way is slackened, and three men standing on the chain-wales heave out the lead. When the line ceases to run, it shows that the bottom is reached, and the number of fathoms which the line has run off is then counted. There are also the *quadrants* and *sextants*, for taking the altitudes of the sun and stars, and ascertaining the longitude and latitude. With these are included the *chronometers*, some of which keep such good time that they lose scarcely a second in a voyage round the world. *Charts*, *telescopes*, *barometers*, *speaking-trumpets*, &c., are among the necessary articles. We may mention, finally, the different kinds of implements employed in various kinds of work on shipboard, such as the *axe* (*pl.* 11, *fig.* 19); the *hatchet* (*fig.* 25); the *horse-bit* (*fig.* 23), for cutting straight grooves; the *adze* (*fig.* 24), for cutting curved grooves; the *scraper* (*fig.* 21) and the *double-scraper* (*fig.* 22), to clean the

planks and seams ; the *caulking-tools* (figs. 26, 27), for driving in the oakum ; the *caulking mallets* (figs. 31, 32, 32 b) ; the *pitch ladles* (figs. 17, 18) ; the *tar-brush* (fig. 33) ; and the *callipers* (fig. 34), used to measure the circumference of the different spars and bolts.

3. THE DIFFERENT KINDS OF SHIPS.

In common parlance, every vessel that sails on the high seas, or perhaps only navigates a river, is called a ship ; but seamen make nicer distinctions, and give that name only to vessels with three masts and square sails. It is not easy to divide vessels into exact classes, as the purposes for which they are intended, their size and construction, the arrangement of their masts and rigging, their armament, &c., establish differences, which are again set aside in particular cases by the combination of different qualities. The best method probably is to classify vessels according to the purposes for which they are designed, although in that case the same form will recur in different divisions.

In the external figure of a ship we distinguish the parts above water and those below water ; the first are called the *casing*, the second the *floor*. The form of the floor is determined by the purpose of the ship. A ship of war must have the lowest guns at least four feet above the highest water-line ; it must sail and steer well ; it must carry numerous sails ; it must not roll nor pitch much, nor make much lee-way. A merchantman must sail and steer well, carry many sails, lie easy on the water, contain a large cargo, and require only a small crew. It is difficult to unite these qualities, some of them demanding a broad, others a narrow vessel. Narrow vessels are rapid sailers ; they make but little lee-way, but are contracted for room, and are apt to pitch. Broad ships give more space, and if the keel is sharp and deep, can carry much heavier sail, as the masts can be made a foot higher for every inch in depth of the keel below the planking ; but if the keel is flat, they pitch and make great lee-way. The English make the greatest breadth of the ship towards the bow, believing that in that case she sails better and minds the helm more readily ; yet it has been shown by experiments in France that it is best to have the greatest breadth amidships.

The most important points in the construction of a ship are firmness and durability ; all its parts, therefore, must not only possess the requisite soundness and strength, but must be so closely connected with each other, as to be able to resist the combined force of the sea and the wind.

The objects of the voyages, their duration, and the climate of the countries visited, have an influence on the size and construction of the vessel ; we have, consequently, according to the size, ships of such a number of cannon ; of so many tons ; of the first, second, and third class, and the like ; and according to the construction, frigates, cutters, galleys, &c., and steam-boats. According to the objects of the voyages, we have ships of war, transport ships, merchant ships, slave ships, mail ships, privateers, and others.

A. *Ships of War.*

The *length* of a ship of war is determined by taking the number of guns in the lower battery, adding the length of their port-holes (2 feet 11 inches for each 36-pounder) and the number of spaces between (7 feet 8 inches for 36-pounders), allowing two and a half of these spaces for the stern and prow, and we have the whole length of the ship from stem to stern. A ship carrying sixteen 32-pounders in each battery must consequently be about 187 feet in length. Although the spaces between the port-holes are sometimes less, the length of such a ship never falls short of 182 feet.

For the *breadth* of a ship (that is, the length of its main beam), some take the mean between a third and a fourth of its length, in this case 50 to 54 feet; others take 3 inches 3 lines to every foot of length, making the breadth from 48 feet 5 inches to 50 feet 6 inches.

The *hold* (the depth of the ship) goes from the lower side of the main beam to the upper part of the keel; it is larger at the stern than at the stem. In ships of war of forty-six or more guns, the depth of the hold is equal to half the breadth of the ship, and in frigates is somewhat greater.

For the angle of the stem-piece we take the eighth part of the ship's length, and for that of the stern post $\frac{1}{32}$ of the same dimension; that is, $22\frac{3}{4}$ to $20\frac{1}{8}$, and $5\frac{1}{2}$ to 6 feet. This determines the length of the keel. Ship-builders are not fully agreed on this point, however, some preferring to make the stem-piece almost perpendicular, and the stern-post wholly perpendicular. For the height of the stem-piece, some builders take one quarter of the ship's length, others from one tenth to one twelfth, the stern-post being about one fortieth shorter.

The length of the main transom is two thirds of the ship's breadth; it is placed at a height equal to the depth of hold and the elevation of the lower deck. No exact rules can be given for the form and position of the ship's timbers. Vessels of a sharp build, in which the timbers make a large spring from the keel before bulging, draw more water than flat-built vessels, and hence present more resistance and make less lee-way. The latter, on the contrary, have less draught and are broader in the hold, which is an advantage in laying the lower gun-deck. The position of the main or middle timber, which determines the greatest breadth of the ship, is a controverted point among ship-builders, some placing it further forwards, and others near to the midships; the last is preferable, as it diminishes the burden towards the stern. The timbers at the stem and stern are drawn nearer to each other, contracting the hold in those parts of the ship: this is done at the stem in order that the ship may cut the water with more facility, and at the stern for the advantage of steering. The timbers are also somewhat contracted at the upper ends (forming the bulge of the ship's sides) in order to break the force of the water and to bring the greatest burden below, to say nothing of other advantages. The breadth and the curve of the stern are according to the taste of the builder.

Ships of war are divided according to their size into classes, of which there are properly only three, the smaller vessels being called frigates,

corvettes, brigs, cutters, sloops, &c. The English, however, reckon six classes, the Dutch seven, and the French five. In England, ships of the first class number 850 to 900 men, 100 to 130 guns, 178 to 200 feet in length, and 2000 to 3200 tons burden. They descend in proportion until we come to the sixth class, which have 150 to 200 men, 20 to 32 guns, 88 to 120 feet in length, and 400 to 680 tons burden. It is more common, however, to designate ships by the number of their guns. Ships which carry 64 guns and upwards are called *ships of the line* (*pl. 25, fig. 2*), because they form the line of battle in a naval action (*pl. 29, fig. 3*), and at sea always sail in a line before or abreast of each other. If they have three decks, they are called *three-deckers*; the others are called *two-deckers*. *Pl. 14, fig. 5*, is a French ship of the line of the second class. *Frigates* are the most rapid and easy sailers of all ships. *Fig. 4* is a French frigate of 60 guns, and *pl. 10, fig. 3*, is one of the latest construction. The build of frigates and their outfit serve as models for ships of the line and other men-of-war, which are said to be frigate-built. In fact, two-deckers and three-deckers are nothing but frigates with one or two additional stories and larger masts, although their masts and sails are smaller in proportion than those of frigates.

The interior arrangement of ships of war differs in different countries, but it may be reduced to three principal methods, the English, the French, and the Dutch, as other countries merely copy one or the other of them, with more or less modifications. Ships of war of 90 or more guns are built with three decks, and those of 50 to 80 guns with two decks, besides those which are not furnished with guns or only partially. Frigates and smaller ships have only one gun-deck and no poop deck. The gun-decks are numbered from below, and are also called *lower*, *middle*, and *main* or *upper* decks. Each deck between the main deck and the hold is called a between-deck. The deck is divided lengthwise into the fore-deck, midships-deck, and after-deck. The lower deck carries the heaviest guns, in three-deckers mostly 36-pounders, and rarely 48-pounders or 56-pounders. The middle deck carries 24-pounders and 18-pounders, the main deck 12-pounders. On the fore-castle and quarter-deck are 6- and 8-pounders. Two-deckers have light guns throughout, from 24-pounders to 4- and 6-pounders. We will give a more detailed description of a Dutch and a French two-decker, as it is easy to apply the description to a three-decker or a frigate, by supposing one deck added or taken away. *Pl. 9, fig. 27*, represents the longitudinal section, and *pl. 10, fig. 1*, the upper view of the lower gun-deck; *fig. 2*, the view from above of the poop, the quarter-deck, the gangways, as well as the upper part of the middle deck of a Dutch two-decker of 74 guns. Although many parts of the main deck are concealed by the fore-castle, the quarter-deck, and the poop, we have designated their place by numbers.

The *hold*, A (*pl. 9, fig. 27*), is the space between the keel and the lower gun-deck. It is divided into the lower hold and the upper hold, which are separated from each other by the *orlop*, a light deck near the water line. On this deck are the steps for the heel of the mizen-mast and for the gudgeon of the forward capstan⁸⁷; the lower ends of the bitts⁸⁷ are also fastened here. The lower officers and mechanics have their berths on this

deck, though they have no fixed position on it. The greater part of it is kept empty, in order to stow away articles on it during an engagement which would otherwise be in the way. The space below the orlop is, as it were, the cellar of the ship, and contains many rooms of various kinds. We here see the *keel*¹; it is altogether 140 feet long. The *kelson*,² parallel with the keel. Between these pass the ship's timbers, which set into grooves in the kelson two inches deep. The spaces between them are filled with blocks called *dead-wood*. The kelson serves to support the heel of the masts and of the main capstan. The *run*,³ where the ammunition is kept. The three *bread-rooms*⁴ are lined with tin, for the better preservation of the biscuit. The *after magazine*⁵ contains chests filled with cartridges and kegs of powder; and in order to lose no room, firewood is stowed in the vacant spaces. The room is lighted with the powder-lantern.⁶ The *after-hold*⁷ is floored with boards laid on the ballast, forming a sort of *orlop*, and contains barrels of beer, salt meat, and the like, the spaces being filled with firewood. The *captain's wine hold*⁸ is on the starboard side and is separated by a partition from the *cheese-rooms*⁹ on the larboard. There are avenues running between the partitions and around and through them. The *steward's room*,¹¹ where he keeps the provisions for daily use and distributes them to the galley and to the men. The *water-cistern*¹² is a vessel with a cock to supply the lower hold with fresh water, after the spoiled water has been pumped out. It is useful to the portion of the ship which remains under water to keep it full of water to a certain height on the inside. The *pump well*.¹³ The *shot-lockers*¹⁴ are places on each side of the pump well for keeping cannon balls. The *cable-room*¹⁶ contains the cables, disposed in such a manner as not to disturb the equilibrium of the ship. The floor is grated for the water to drop from the ropes into the lower hold. The *main-hold*.¹⁵ Orlops are erected here (as at ⁷) over the ballast. On these are placed the water-casks, over them the beer barrels, and then smaller barrels of provisions. The carpenter's timber is stowed in this room. At about half the height of the room is an orlop with the berths of the sailing-master and of the boatswain and his mates. During an engagement the chests of the sailors are placed here, and are so arranged that the wounded can be laid upon them, while their wounds are dressed by the surgeon. This is called the *cock-pit*. The forward *provision chests*¹⁷; the *sailroom*¹⁸, where are kept all the spare sails, and when in port those belonging to daily use. Here also are *passages*^{*} at the centre and the sides. In the middle one are hung the cartridge-boxes and powder-horns. Here is a second *cistern*²⁰ and a second *magazine*,²¹ similar to the first. The *forward run*²² is the most forward part of the hold, containing the spare ropes and rigging. A light is kept here day and night and a watchman.

The *lower deck*, also the *first deck*, B, carries fourteen 36-pounders on each side. The places between serve for the quarters of the sailors and marines, where their effects are kept, and where at night their hammocks are hung. *Pl. 21, fig. 4*, night time; *fig. 5*, day time. *Pl. 10, fig. 1*, and *pl. 21, fig. 5*, show the position and in part the fastening of the guns. The after part of the lower deck contains the room of the *master-at-arms*,¹⁷ *pl.*

9, *fig. 27*, extending from the stern almost to the mizen-mast, where it is separated by a thin partition covered with linen, which in time of action is removed. Here are the quarters of the midshipmen, the clerk, the surgeon, the chaplain, and others, and also, according to the room, some of the officers of marines. In this room, which is often partitioned off into several smaller rooms, we observe the *tiller*¹⁵⁷ passing along the deck with the *tiller rope*, which runs on both sides and then back to the centre, going through each deck to the *wheel*⁴¹⁷ on the quarter-deck. The *run hatch*¹⁹⁷ [²⁵],* where the master-at-arms keeps his stores. The *bread room hatch*¹⁸⁹ [²⁶]. The *passage hatch*¹⁶² [²⁷], which, as the hatch to the after powder magazine is in the centre passage, is covered with lead and fastened with a padlock. The *hatch* to the steward's room¹⁴⁷ [²⁸] leads to the wine hold, to the cheese room, and to the after lantern. The *main capstan*¹³⁷ [²⁹]. This shows also the mode of drawing in the cable by the *messenger*. This rope (*pl. 11, fig. 15 c*) is from 9 to 12 inches thick, the ends connected together (as at *bcd*), forming a ring. Knots, *a*, are made in it at the distance of every five feet. When the cable is to be hauled in, a few turns of the messenger are taken round the capstan, the remainder being stretched to the bow and attached to the cable near the knots by little flat ropes called *nippers*, with which the sailors take a few turns round both cable and messenger, keeping hold of the ends, walking along near the cable as it is wound on, and releasing the nipped cable when they have reached the hatchway (*pl. 9, fig. 27*¹⁰⁷ [³²]). The cable then descends into the hold whilst the messenger is being kept winding around the capstan, the unwound part, of course, returning to the bow, where the same operation is recommenced, and so on, until the whole cable is brought on board. The hatch to the *after room*¹⁴⁷⁷ [³⁰] leads also to the after shot-locker and the cable room. On each side of the hatch are two stout rollers, on which the messenger runs. The *pumps*¹²⁷ [³¹] discharge the water into gutters which carry it to the scuppers. The *main hatch*¹⁰⁷ [³²] leads into the main hold and serves to let down the barrels with which it is stowed. The *blacksmith's shop*⁹⁷ [³³] with a small anvil, and a movable hearth with bellows. The floor is covered with sheet iron. The blacksmith's shop is also often contiguous to the galley. The *forward capstan*⁸⁷ [³⁴]. The *forward hatch*³⁶ [³⁵] leads into the forward part of the main hold. The sheet anchor is laid here, one arm of which reaches down the hatch. The *bitts*³⁷ [³⁶], to which the cable is fastened. The *hatch* to the forward passages³⁶⁷ [³⁷] and the *hatch* to the *forward run*³⁶⁷ [³⁸]. The *water troughs*²¹⁷ [³⁹], which receive and lead off the water which comes into the ship when the anchor is hove up. The *hawser holes*²²⁷ [⁴⁰], through which the cable passes.

The *upper*, or *second deck*, C. Although the poops, the quarter deck, and the forecastle are all over this deck, it is called the upper deck, because those parts are regarded as separate appendages. This deck, especially with the English, is now entirely built over, but as the erections have no broadsides of guns they do not receive the name of decks. The parts have the same

* The figures in brackets [] refer to *pl. 10, figs. 1, 2*.

names as before; the forward part is called the fore-castle, the after part the quarter deck, and the passages on each side at the centre the gangways. In the deck here represented we find the *cabin* ²³ [41], called the *lower* or *main cabin*. It resembles an elegant parlor, receiving its light through glass windows in the stern. In time of action, these are replaced by frames covered with fine painted wire. The port-holes on this part of the deck are also furnished with windows. On each side of the entrance to the cabin is a small room for keeping eatables and other stores.

The forward wall and the side partitions in general are movable and consist of lattice frames covered with linen, and are taken down on the commencement of an action. In English men-of-war these partitions are often of wood, but so constructed as to be easily removed. The cabin is finished in a style of great elegance and tastefully painted, and even the cannon have such a splendid exterior that one is tempted to regard them as martial ornaments. There is sometimes a difference in the arrangement, as after the upper cabin is finished the admiral or other high dignitary on board takes his choice, and the remaining one is partitioned off as quarters for the officers or their personal suite. The sleeping room of the commander-in-chief ²⁴ [42], if he has his quarters in the main cabin, is between that and the second cabin. The *church* ²⁵ [43] is a large room running across the deck, which is separated by a sail-cloth curtain from the poop and the other portions of the deck. Divine service is held in this room, and at the same time it is used as an armory and as a mess-room for the officers. A *hatch* to the lower deck ²⁶ [44]. This is only made use of during a battle. The *upper capstan* ²⁷ [45] serves as a support for the main capstan, with which it is connected. The *stairs* to the quarter deck ²⁸ [46]. The *after hatch* ²⁹ [47]. The *main cross-pieces* ³⁰ [48]. When the ship is at sea, some spare spars are placed, one end on the cross-piece of the belaying pins and the other on the fore-castle, while other spars are laid crosswise with their ends on the gangways, forming a frame for the long boat and some of the cutters. The *main hatch* ³¹ [49], through which all barrels and other parts of the ship's lading are lowered into the hold. A *hatch* with two ladders ³² [50], leading to the lower deck. The *forward hatch* ³³ [51] is over that of the lower deck, so that each leads to the forward part of the hold. The *caboose* or *galley* ³⁷ [52] is a small room under the fore-castle, containing apparatus for cooking, provided with a hearth, an oven, frying-pans, &c. The *carpenter's shop* ⁴² [53] contains also the berths for the carpenter and his mates. The *cook's berth* [54].

The *quarter-deck*, D, carries six 8-pounders on each side, and is the place where the officers, midshipmen, and sailors keep watch (*pl.* 21, *fig.* 1). The cabin in the after part (*pl.* 9, *fig.* 27⁴⁸) [55] is arranged like the lower cabin, but is superior to it in some respects. In addition to the side galleries it has also a stern gallery. From the cabin door the whole service of the ship can be seen at once. The cabin is lighted through a glass door in the after part and through the port-holes (⁴²).

The deck over the cabin is called the *poop-deck*, from which two ladders (*pl.* 21, *fig.* 1, and *pl.* 10, *fig.* 2) lead to the quarter-deck. The signal-keepers are stationed on the poop-deck, with the chest of signal flags; the lead is

thrown from the fore chain-wales, but hauled up and examined on the poop deck (*pl.* 23, *fig.* 4), and the nautical observations are here taken; it formerly carried cannon, but now it has only swivels. The deck runs from the taffrail to the mizen-mast, where it has a railing, which projects four or five feet over the cabin, resting there on posts.

Under this projection is the *wheel* (*pl.* 9, *fig.* 27⁴¹) [⁶⁰]. It is about nine feet in diameter, with an axle of fifteen inches (*pl.* 21, *fig.* 2).

The *binnacle* is before the wheel. This is a wooden box with three sliding partitions; in the middle division is a lamp hanging on gimbals, and in each of the contiguous divisions a compass, which is lighted by the lamp. Here also are kept the hour-glasses, the half-minute-glasses for the log, the spy-glasses, and the copper speaking-trumpets. No iron must be used about the binnacle.

The *deck-light* of the *church* ⁴⁴ [⁵⁸] is partly covered with a grating and partly with windows, forming a lantern with oblique sides; in rain and storms it is covered with a tarpaulin.

The *accommodation-ladders* ⁴⁵ [⁶¹] are on the outside of the ship from the forward part of the quarter-deck to the surface of the water; they have ropes on each side, which, fastened at the top to iron bolts, serve as balusters.

The *gangways* ⁴⁶ [⁶²] on each side of the ship connect the quarter-deck with the fore-castle.

The *fore-castle*, E, carries three 8-pounders on each side. Two ladders ⁴⁷ [⁶³] lead from the after part of the fore-castle to the main deck; between the fore-castle and the main deck is the *ship's bell* ⁴⁸ [⁶⁴], which is rung from the main deck; the *chimneys* ⁴⁹ [⁶⁵] of each galley have movable pots, to prevent the return of the smoke; the *fore-cross-pieces* ⁵⁰ [⁶⁶], for the running rigging of the fore-mast; the *davits* ⁵¹ [⁶⁷], to hold the anchor when it is about to be cast, and to bring it up when it is hove; the *kevels* ⁵² [⁶⁸] are stout cleats on the sides of the ship, for belaying the large ropes.

As we have described the Dutch ship of war at length, we need not enter into details with regard to the French ship, which is the same in all essential points, differing only in certain arrangements, which are shown in *pl.* 12. *Fig.* 1 is the *main-forward-deck*, *fig.* 2 the *after-deck*, and *fig.* 3 a lengthwise view of a French two-decker, with a portion of the planking removed. For the sake of still greater clearness, we have given on *pl.* 22, *fig.* 1, an external view of the forward part of a French frigate, *fig.* 2 the after part. We have only to add one story, and we have a two-decker. In *pl.* 12, *figs.* 1, 2, 3, AA are boats hanging at their scantlets; BB, the stern-galleries; C, the rudder; D, the poop; E, the hammocks; F, the first battery; G, the second battery; H, the third (half) battery; K, the davits, with the anchor; LL, the hawse holes, with the cables; N, the top; ¹, sail-ors on the main top; ², men drying the sails; ³, hoisting the signal flags; ⁴, tarring the bowsprit; ⁵, lowering the water-casks through the main hatch; ⁶, the surgeon examining the sick; ⁷, the captain's cabin; ⁸, the dining-room; ⁹, the galley; ¹⁰, midshipmen's cabin (see also *pl.* 21, *fig.* 6); ¹¹, the sailors' quarters; ¹², drilling at the guns; ¹³, officers' cabin; ¹⁴, officers' mess-room; ¹⁵, hospital; ¹⁶, drilling the marines; ¹⁷, the sailors at dinner; ¹⁸, repairing

the sails ; ¹⁹, provision-room ; ²⁰, sick-room ; ²¹, small boat ; ²², sail and rigging-room ; ²³, prison (see also *pl. 25, fig. 8*) ; ²⁴, shot and rigging-room ; ²⁵, wine and spirits-room ; ²⁶, powder magazine ; ²⁷, tackle-room ; ²⁸, general store-room ; ²⁹, cattle-stalls ; ³⁰, fodder-room.

Frigates (*pl. 14, fig. 4*, and *pl. 10, fig. 3*) take the first rank after ships of the line, and are built on a similar plan. They have three masts, with the same kind of sails, quarter-galleries and head, with fore-castle and quarter-deck, but no poop, and only one gun-deck. They formerly carried as many guns on the fore-castle and quarter-deck as on the main-deck, but now they are made longer in preference, in order to have the cannon mostly in one battery. There are frigates of from twenty to sixty guns ; those with over thirty are called heavy frigates. Frigates must sail rapidly and near the wind, but at the same time be able to bear the sea in a strong wind, as they are used chiefly as cruisers, sailing in all directions to watch the motions of the enemy, to clear the sea, to convoy merchantmen in time of war, or to bring prizes into port. In a general engagement they take no direct part, as they could not stand long against a ship of the line. They consequently take position behind the line, and form a second row, protecting the transport and hospital ships, and coming to the aid of the ships of the line at the orders of the admiral. Some of them are deputed merely to communicate signals from the admiral's ship during the battle, and are hence called repeating frigates. After an engagement the frigates take in tow those ships of the line which are so disabled that they cannot sail, and, in short, they perform an endless variety of duties, and may be called the light troops of the sea service.

Next to the frigates come *sloops-of-war*, also three-masted, but sometimes with only two masts, built like frigates, and carrying only from fourteen to eighteen guns. The two-masters have only the main-mast and the fore-mast, each of them somewhat longer in proportion than those of frigates, in order to supply the place of the mizen-mast. The try-sail is attached to the main-mast by a gaff ; it is broader at the foot than at the head, and is stretched by a sheet. Instead of the main-mast it is sometimes hung to the *snow-mast*, a spar fastened between the trestle-trees, and is hence called a *snow-sail*. Merchantmen with masts of this kind are called *snows*. Sloops of war are very easy and rapid sailers ; they are used to convey orders, for cruising, and for blockading harbors in which there are no ships of war. *Pl. 14, fig. 3*, is a three-masted sloop of war, frigate built, of twenty-two guns.

A *brig* or *brigantine* closely resembles a two-masted sloop, for which it is often mistaken. The difference consists in the mizen-sail, which in a brig is not a gaff-sail but a boom-sail (*pl. 10, fig. 6*), attached by a boom to the main-mast. As the boom projects over the stern, and must be turned, there is no flag-staff, and the flag is drawn up by the flag line to the gaff-arm, an arrangement prevailing in all vessels which have boom-sails. A brig has no fore-castle or poop-deck ; it has from fourteen to twenty-two guns. *Pl. 17, fig. 4*, is a Swedish 20-gun brig of war, sailing close to the wind ; *fig. 5*, an English 20-gun brig, laid-to. The object of this manœuvre

is to deaden the ship's course in an instant, and it is performed by bringing one half of the sail to the wind, and bracing the others aback. Two signal flags are flying at the fore topsail yard-arm in our figure.

Cutters, another kind of vessel of war, have an entirely different build, and are adapted to make their way through the water with the utmost rapidity. They are rather long; the stern is small, and sits deep in the water; the prow stands perpendicular, and has no head. A cutter at the most is 100 feet long, 32 feet wide, and eighteen feet deep, of 180 to 360 tons burden, and carrying from 6 to 8 light guns, usually 6- or 8-pounders; they have only one mast, very high and inclining towards the stern. In small cutters the mast is of one piece; in those of a larger size there is a top-mast and cross-trees, but no top; the bowsprit lies horizontally. A cutter has a boom-sail, a top-sail, a top-gallant-sail, several stay-sails, and sometimes also a royal; a studding-sail and a spanker may also be used. They are employed as coast guards, and to carry orders. *Pl. 17, fig. 3*, shows an English war cutter close to the wind. The cutters in the merchant service must carry other sails. A smaller kind of cutter carries from four to eight light guns.

Schooners are built like cutters, but have two masts. The fore-mast carries a gaff-sail, and the main-mast a boom-sail of considerable height. Both masts have stay-sails, and also top-gallant-sails. There are several stay-sails on the bowsprit, and a fore-stay-sail on the fore-mast. As the stay-sails have no effect when the vessel is directly before the wind, a square fore-sail is then set, which in such cases is also used in sloops and cutters. A schooner carries from four to eight light guns. A variety of manœuvres by these vessels is shown on *pl. 29, fig. 1*.

A *galliot* is a medium between the brig and the schooner, which is now in common use in the navy of some countries. Its sails are adapted to take the greatest advantage of the wind, and this circumstance, as well as the great simplicity of the rigging, makes it a favorite when light guns are to be used, and when the burden is under four hundred tons. They generally carry from ten to twenty light guns, and are built in every variety of fashion. The common galliot has a yard on the main-mast, and also on the fore-mast. The brig-galliot has on the fore-mast the fore-yard, fore topsail yard, and fore topgallant-sail yard like a brig, but its main-mast is galliot-rigged. Both masts have boom-sails, and the fore-mast has two stay-sails. *Pl. 16, fig. 2*, is a Dutch brig-galliot, drying sail. There is sometimes also a royal (*pl. 15, fig. 9*). *Pl. 14, fig. 1*, shows one galliot with only a yard at the fore-mast.

A *lugger* is a small vessel used for carrying orders and the like. It has two masts with topmasts standing in iron rings. The four sails carried on these masts are fastened to yards. The bowsprit can be extended at pleasure, and carry two or three stay-sails. A short mast stands on the stern, serving also as a flagstaff, to which a spanker can be attached. *Fig. 3* is an English lugger giving signals.

We must also here make mention of *galleys*, although they properly belong to the middle ages. They are still used to some extent in France, Spain, and

Portugal, and the coast guard of Sweden consists of a kind of small half galleys. The galleys alluded to in the public journals are properly nothing but ships of war which have become unfit for sea service, and being unrigged are used for prison-ships (*pl. 14, fig. 6*). Similar to the galleys, but smaller, are the *feluccas*, used in the Mediterranean Sea (*pl. 4, fig. 11*, is a felucca drawn up on the land), which are usually 52 feet long and 12 feet broad. They are used both with sails and oars. They serve for the most part as coasters, and are furnished only with some very light guns or with several swivels. Usually they have 12 rowers on each side. The feluccas have two masts, projecting forward from 3° to 5° and carrying lateen sails. There are twelve openings on the deck for the rowers, who do not sit on benches but on the inclosures around these openings, and resting their feet on blocks inside the gunwale. The planks which form the sides project at the stern, and are connected by a board bearing the name of the craft. The helmsman sits at the end of this extension, as the tiller turns on the outside, on account of the captain's tent which occupies the stern.

Xebecs (*pl. 15, fig. 5*), used in the Mediterranean, are long, narrow, and sharp-built vessels, serving principally as cruisers. The smallest xebecs have 12 guns, and the largest 40. They carry three masts; the fore-mast inclines forward, and the mizen-mast has a small yard, to which a square sail can be attached. The masts have no topmasts, but only shrouds, and carry lateen sails. The gaff is composed of two pieces and is longer than the mast tree. The rigging for the sails is very simple, yet these vessels sail with great rapidity. The prow forms a projecting beak, which takes the place of the bowsprit. The stern also projects and has a tent for the captain.

Gunboats are built in a different fashion in almost every country. They have all, however, strong, flat bottoms, as they must keep close to the land, in order to attack fortified places, to convoy coasters, or to land troops. Although they can present no resistance to large ships of war on the open sea, they can give them great annoyance near the shore, as they can run in and out of places which the ship cannot enter, on account of the greater draught. The small boats almost always hit the ship, while she usually fires over them. They seldom carry more than 4 or 6 guns, which fire from the bow and the stern; they have only one mast, with a boom sail or gaff sail and a stay-sail; *pl. 17, fig. 1*, shows a Spanish *balancella* converted into a gunboat.

Bomb ketches are vessels of medium size, carrying two mortars on the bow in order to bombard cities and harbors. They must often operate near the shore, and are consequently built with broad and rather flat bottoms and with great strength (*pl. 4, fig. 10*), in order to bear the recoil of the mortars. They carry a main-mast and a mizen-mast, with yard-sails and stay-sails. The fore-stay-sails are very large in proportion to the others, as the main-mast to which they are attached stands aft of midships in order to give room to the battery on the bow. When the mortars are to be discharged, all the rigging is taken down from the mast, and only the fore-stay remains in its place, and it is, therefore, made of iron. Besides the mortars, the

bomb-ketches each carry 8 light guns aft of the main-mast. The English also have three-masted bomb-ships and the so called *kits* for the same purpose, with a main-mast and mizen-mast, yard sails and stay-sails, and also gaff sails and jibs.

The *fire ships*, which are used to burn the vessels of an enemy, have no peculiar construction, but are old vessels no longer fit for sailing, which are entirely filled inside with pitch, sulphur, gunpowder, and other combustible materials, the rigging being also covered with tar, or sulphur and pitch united together. Everything is connected by trains of gunpowder, so that as soon as the priming is kindled the whole vessel is instantly on fire. When a fire-ship is to be attached to a vessel, it is brought to the windward side; grappling-irons are fastened on the yards in order to catch into the enemy's rigging; they are also thrown upon his decks and their chains drawn tight; the priming is then kindled, and the men make their escape. Instead of fire-ships, Congreve rockets are now generally used. (See Military Pyrotechny.)

Among ships of war are also included war steamers, which we will pass over for the present, as we shall devote a section to steam-vessels, in which we shall recur to the use of the steam-engine in men-of-war. We must here, however, consider one or two other kinds of vessels, which are not, indeed, directly ships of war, as they carry no guns, but are still made use of in naval warfare.

Among these are *transport ships*, used for carrying troops, horses, and other munitions of war from one port to another, or to the stations of men-of-war. Every fleet has a number of these ships attached to it, which carry a supply of sails, rigging, powder and ball, provisions, &c., in order to make good any deficiency. Transports are built frigate-fashion, but are not equipped as men-of-war. During an action they are stationed in the rear of the line, at a distance. They, however, sometimes have a certain number of guns and men, so that at least they can defend themselves if attacked by smaller vessels. The interiors of these vessels are constructed in different modes, according to the purposes for which they are intended, either to transport troops, horses, luggage, freight, artillery, or provisions.

Hospital-ships are generally old frigates or ships of the line past service, the decks of which are converted into wards of different sizes for the sick, and rooms for the physicians, surgeons, and nurses, together with an apothecary's shop. Each division of the fleet has one or more hospital-ships, as only patients with a slight sickness are kept on board the man-of-war and the wounded only receive their first dressings in the cock-pit.

Prison-ships have the same general arrangement, though the rooms used for the confinement of prisoners are smaller and stronger, and there are also rooms for work and for religious service. The overseers and officers have their quarters in the cabin. There are also prison-ships in harbors, and these are entirely unrigged and covered in. *Pl. 14, fig. 6*, is an English ship of the line of the first class, unrigged, and converted into a prison-ship. It might also be used as an hospital-ship.

Privateers are men-of-war of every description, not exceeding light frigates in size. They are fitted out in time of war by private persons, in order to attack the enemy's merchantmen and to destroy his commerce. They receive a commission, called a *letter of marque*, from the government, with which they share their prizes. The vessel captured must be brought into a port and there condemned by the court of admiralty, before the privateer can claim her as his property. Privateers should be swift sailers, in order to overtake their prizes and to escape the enemy's cruisers. Schooners, luggers, and brigs are employed as privateers, but their masts and sails are larger in proportion than those of other ships of war, and in a calm they also make use of oars, which pass through small openings between the port-holes.

B. Merchant Vessels.

Those vessels which are built exclusively for the merchant service are called merchantmen. The guns which they usually carry are so light that they need not be taken into account. It is the main object in merchant vessels to gain an abundance of stowage-room for the freight, together with the necessary accommodations for the crew, which we may add should be as small in number as possible. The spare rigging and sails are mostly kept in the forward part of the vessel, as this space is so much occupied by the fore-mast and windlass bitts that it is not adapted to the stowage of freight. The different parts of the merchant vessel are less exact in their proportions than in ships of war, and their construction often varies essentially in the same country. The smaller vessels do not compare with the larger ones in swiftness of sailing, though they are more pliable. They can, indeed, be built to sail as well as the larger ones, but in that case they must be built broader in proportion, in order to carry more sail, consequently they require a larger crew, so that the advantage is again lost. We have just stated the properties of a good merchantman. In order to secure these it must be very broad in proportion to its length, deep in the hold, and with a flat bottom; but then it will not sail rapidly, nor close to the wind, and the less as it is laden heavily and has a great depth of draught. For a ship to sail well, close to the wind, making small leeway, and easily managed in a rough sea, it must be able to take on much sail, and consequently must be stiff in the timbers; it must be of good breadth of beam, with a sharp bottom, and on account of the large sails and anchors in that case, must be manned with a numerous crew. If a small crew is to be employed, the vessel must have small sails and anchors, and hence must be of a narrow build; but it can then carry little freight. These various qualities, it is evident, are for the most part inconsistent with each other, and on that account the main proportions of merchantmen differ, according as they are designed for different objects.

The burden of merchantmen is measured by tons. A *ton weight* is equal to 20 cwt. dead weight. But as both capacity of carriage with regard to weight and room for stowage have to be taken into consideration, the ship is usually measured by the latter, and a *ton of measurement* is equal to

40 cubic feet, by which standard light goods are shipped, whilst dead weight, with which the ship cannot be fully laden without sinking, is reckoned by tons' weight, according to the ship's capacity of burden.

There is a great variety in the kinds of merchantmen, but they are all more simple in their construction than ships of war. Those of the largest size have a deck below the main deck, called the *between-deck*, in the forward part of which is the *cable-room*, where the cables and the spare rigging are kept. The *cabin*, which is usually furnished with considerable elegance, is at the stern. This contains the sleeping berths for the captain and mates. In the *run*, under the cabin, is a *sail-room*, where the sails are kept, and the *steward's room*, for provisions. In merchant vessels the galley (kitchen) is on the deck, abaft the fore-mast or between the main and fore hatches. The crew have their berths under the forecastle. When the forward hold of the ship is divided off by a partition, the space is called the *forward run*, and serves as a store-room for fresh water, firewood, coal, &c. Vessels of a smaller size have no between-deck, and the whole interior space is occupied for stowage, except a small portion at the stern, which is partitioned off for the cabin. For the crew and luggage there is a place constructed on the deck abaft the main-mast, containing the galley, the steward's room, and the sailors' berths. The cables and spare rigging are kept on the deck, covered with tarpaulin. As regards the external construction and rigging, merchantmen are classified as ships, barques, brigs, schooners, sloops, cutters, luggers, &c.

Full-rigged ships have three masts with square sails. They are of sharp construction, with a head and sometimes galleries. *Pl. 26, figs. 9 a b*, represent French ships of this kind under sail. *Pl. 15, fig. 1*, shows the after part of a French merchantman, with a shark being drawn in at the stern. Vessels of this kind measure from 300 to 1000 tons, and sometimes more. The East Indiamen, intended for long voyages, carry 8 or 10 small guns on each side of the between deck. In the middle of this deck places are partitioned off for the sails, the spare rigging, and the ship's stores. The spaces between the guns form the quarters of the crew, who often number from 80 to 100 men. The galley is forward in the bow. The cabin is often splendidly fitted up.

Brigs (*pl. 15, fig. 11*) are very favorite merchant vessels, as they have two masts with square sails and can be managed by few men.

Pinks (*pl. 15, fig. 6*) are used principally in the Mediterranean, though less common now than formerly. They have three masts, the two forward ones being made out of one piece. They have lateen sails. A projecting beak takes the place of the bowsprit. The sails are awkwardly arranged. In a high wind square sails must be hoisted, in order that the vessel may stand the sea. The fore-mast is particularly inconvenient, as it inclines forward to an excessive degree. In the North Sea and the Baltic the name *pink* is applied to three-masted merchantmen, which differ from barks only in being higher built, sharper below, and narrower in the stern.

Barques are three-masters, square-rigged on the fore and main masts, but

with gaff-sails on the mizen. *Fig. 10* represents a barque with her sails loose; *pl. 16, fig. 4*, one at anchor, taking in freight. By a barque in the Mediterranean is understood a short, full-built ship, with the greatest breadth forward. The main-mast is in one piece, but high, and fitted with a main-sail, a top-sail, and a stay-sail; the mizen-mast is in the common form, with top-mast and top-sail. The fore-mast inclines forward and carries a lateen-sail. A beak takes the place of the bowsprit.

*Galliot*s are two-masted. They carry masts and sails like brigs, only the fore-mast is the highest. *Fig. 8* shows a galliot under sail.

Howkers, when they are three- or two-masters, are similar to the galliot, but have a head forward. They usually carry a main-mast and a mizen-mast. They have a main-sail, and often a top-sail and top-gallant-sail. There is a fore-stay forward with a jib, and often a flying-jib on the jib-boom. These vessels are in use among the Dutch, the Danes, and the Swedes.

Cutters are rather flat, round at stem and stern, and have a main-mast and mizen-mast (*pl. 16, fig. 1*). The mizen-mast, and sometimes also the main-mast, carries a gaff-sail with a bonnet, which in good weather is laced to the lower part of the sail, in order to increase its area. They are virtually only two-masted sail-boats.

A kind of vessel, called a *tub*, is used in the North Sea and the Baltic, fitted with *lee-boards*, in order to prevent too great lee-way with a side wind. These lee-boards are made of thick planks plated with iron, with about twice the length of the vessel's depth, and the breadth equal to half the length. They are in the shape of a butterfly's wing. They are attached to the sides of the vessel, where they turn on a head-bolt, and when in use hang like a sword on the side. There is one on each side of the ship, and when it sails near the wind, the lee-board is hung perpendicularly in the water on the lee-side, enabling the ship to make more resistance to the wind and thus diminishing the lee-way. When their use is no longer required, they are drawn back by a tackle to the sides of the ship.

Schooners have two masts, with gaff-, boom-, and stay-sails. If they carry a sail between the mast-head and the gaff, they are called *topsail schooners*.

Hermaphrodite brigs (*pl. 16, fig. 2*) are two-masted vessels, brig-rigged forward and topsail-schooner-rigged abaft.

C. Ships for Special Purposes.

Certain vessels, which, strictly speaking, belong to the class of merchantmen, are yet built for special purposes, and consequently have a peculiar construction, sometimes in the exterior but always in the interior.

Among these we may reckon the *fishermen*, merchant vessels, but provided with the necessary apparatus, boats, and other arrangements for fishing. *Whale-ships* (*fig. 4*) are built for the pursuit of whales in the Northern Ocean, the South Sea, and on the north-west coast of the Pacific. They are usually three-masters, and built with great strength, in order to

resist the ice. They are well supplied with spare boats as a provision against the numerous casualties to which they are exposed.

Large three-masters, called *flutes*, are built in Holland and Hamburg for the whale fishery, round at stem and stern, and very flat throughout. The masts are short in proportion, and the ships sail too slow for merchantmen. In the South Sea, as it is a great distance to the fisheries, fast-sailing vessels are used, carrying presses and kettles, in order to press out the blubber on the spot. For the herring fishery a kind of vessel is used called a *buss*, which has a main-mast with a main-sail, a top-sail, a stay-sail, and a mizen-mast with a half mizen-sail. The nets for taking the herring are dragged by the ship, and when filled are brought in by the windlass.

Coasting vessels are used for the coast fisheries as well as for the coasting trade, for which latter purpose they are built lighter, and rigged for rapid sailing. For the fisheries they are built heavier, in order to stand a rough sea. *Pl. 15, fig. 4*, is a French coaster fitted out as a fisherman. Smaller vessels are called *fishing-smacks*. *Fig. 2* is a Havre de Grace vessel of this kind. *Fig. 3* is a vessel used in the Mediterranean as a coaster, and sometimes for longer freighting voyages, as they are of a good size and are well rigged. *Pl. 11, fig. 2*, is the forward part of a Normandy fishing-smack. *Pl. 15, fig. 1*, is a Newfoundland fisherman.

Slave ships (*fig. 11*) are vessels which purchase slaves on the coast of Africa in order to sell them again in other parts of the world, especially in the West Indies and South America. They are usually brigs and schooners; they must be fast sailers, and therefore have large masts and sails. They must also be of a broad build, for the sake of room in the hold. As much has been done by the English to prevent the slave trade, recourse is often had to the most cruel measures in order to carry as many slaves as possible in one vessel, and at the same time to conceal the real character of the freight. The forward and after part of the hold is consequently used for the stowage of goods, while the slaves are packed together amidships in crowded masses. The decks are divided by planks at half their height into two layers, so that two tiers of slaves can sit and lie over each other in the same part of the deck, for standing is impossible. The French brig *Vigilante* was captured, in 1822, with 345 slaves in the middle hold, part of them lying down and a part sitting, like the Turks, with their legs folded under them. They were all chained together in couples, and also chained to the ship in rows, the chain passing through a ring in their iron collars.

Emigrant ships (*pl. 16, fig. 5*) are merchantmen which, with the recent increase of emigration, are arranged with special reference to this object. They are for the most part three-deckers. The principal object being to transport passengers, and the carrying of freight being incidental whenever the number of emigrants leaves any spare room, the between-deck is divided into small berths, and the cabin fitted up with more or less comfortable state rooms, for which the richer class of passengers are willing to pay a higher fare.

D. Iron Ships.

The increasing use of iron, and the obvious advantages growing out of it, have suggested the idea of constructing iron ships. The first successful experiment was made with river navigation; but soon iron sea-going vessels were built; and in 1820 the first iron steamship, whose parts were constructed at Birmingham, made the voyage between England and France. Iron men-of-war are now built 200 feet in length. These vessels possess the advantage of lightness, and also, as the carpentry work is superseded by narrow iron ties, of a greater amount of room; they moreover last longer without repairing, the one mentioned above having run some thirty years with scarcely any repairs being found necessary. Iron has great advantages for screw propellers, as these must be built very sharp towards the stern for the best effect, and an iron stern-post three inches thick will answer, while one of timber must be at least a foot in breadth.

In iron ships the keel and ribs are made of iron; the different parts of the keel are connected with each other and with the stemson and stern by flat bands 15 to 18 inches long, which are strongly riveted together, and joined to the adjacent plates at half their length; the ribs are curved over iron models of one inch in breadth and a quarter of an inch thick, corresponding with the draught-plan; and then the plates are laid upon them in courses, and bored with holes to match. In vessels of large and medium size the ribs usually consist of two or three pieces, the floor-piece and two top-pieces, which are joined together in the centre of the plates by iron bands. When one of the ribs is so far completed it is fastened to its place on the keel, and temporarily attached to the deck-frame by a band. Each plate is joined to the rib by four rivets, two in the centre and one at each seam. These last it has in common with the adjoining plates. The plating commences as soon as the ribs are connected with each other and with the stemson and stern. The plates are bent into form over a cast-iron model; they are first heated, and then beaten into shape by large wooden beetles. Up to the water-line the plates are half an inch thick, and above rather lighter; they lap over each other, and are riveted at the joints. Sometimes, when a degree of elegance in the construction is required, they do not lap over each other, but meet square at the ends, being joined on the inside by iron bands, and in that case they receive a double riveting. The plates are fastened together in the same manner in the lengthwise direction of the ship; they are also sometimes double riveted when they lap over each other, and in that case, according to Fairbairn, are 15 per cent. stronger. The keel-plates and the wale-plates are at least double riveted. The deck is sometimes made of iron plates a quarter of an inch thick; it is thus on the whole more durable, but not so convenient for the crew, as they are apt to slip when there is water on the deck. Iron vessels outlast three or four times those made of timber, provided they are kept in good order and free from rust. The plates between wind and water suffer the most, and must often be painted anew. *Pl. 17, fig. 2*, represents the battery of an iron steam propeller, this mode of construction being now applied to men-of-war.

E. Steamships.

When steam power is used instead of sails to propel a vessel, it is called a *steamship*, *steamer*, or *steamboat*. Soon after the invention of the steam-engine, the idea occurred of applying it to navigation; but it was not until the year 1807 that Fulton built the first steamboat. This was used on the Hudson river. In 1813 the first steamboat was seen on the Thames, and soon they were brought into use on the North Sea and the Baltic, the Mediterranean and the Atlantic coasts. Steam navigation between America and Europe was introduced at a much later period, after having for a long time been pronounced impossible.

As just stated, the steam-engine is the moving power in steamships, sails being only occasionally used as an additional force, in order to save fuel. In steamships the engine is arranged either to drive paddle wheels or an Archimedean screw, the vessel being propelled by each of these moving powers. The engine generally differs little from those in common use, except that, on account of the limited space, the working-beam is either omitted or placed in a low part of the engine. As we have already described the different parts of the steam-engine (see *Mechanics*, in Vol. I.) we will here merely give an account of some of the best steam-engines that have been constructed for ships. *Pl. 18, figs. 1 to 9*, represent a steam-engine of 160 horse-power, consisting of two connected engines working on a common crank-axle, the ends of which carry two paddle-wheels, the axle passing through the whole breadth of the ship. *Fig. 1* represents the two engines, the larboard engine in a front view, and the starboard one in a section through the regulating cylinder; the air-pump, the condenser, and its pipes are left out for the sake of greater clearness; *fig. 2* is a horizontal section of the regulating cylinder, and *fig. 3* a vertical section of the same; *figs. 4, 5, and 6*, are the details of a cylindrical sliding-valve; *fig. 7* is a side view of the larboard engine, with a vertical section of a part of the deck; *fig. 7^a*, and *fig. 7^b*, are details of the regulation for the injection of steam; *fig. 8* is a half horizontal section of the larboard engine, in the direction of the line 1, 2, in *fig. 7*; *fig. 9* is a half view from above of the same engine; A is the steam cylinder, in the chamber of which, A', the air-tight and steam-tight piston-rod moves up and down, being secured in a perpendicular direction at the top by the plate, J, which rests on the supports, J'. The piston-head, G', raises one end of the lever, G, which moves at the other end on the pillar, H. In order that the piston-head, and the lever, G, may follow the perpendicular direction of the piston, the cross-bar, I, is applied, which turns around the gudgeon, g'', on the plate, J, and moves on the lever at f'; from the lever, G, the double connecting-rod, K, moving on the gudgeon, K', passes to the working-beam, L, which moves on the gudgeon, K''; the working beam plays on the point L'', and at the gudgeon, K', is a third connecting-rod, M, which runs to the crank, N, of the main axle, and causes the paddle-wheels to revolve. The lever, G, consists of two separate pieces, which are fastened together by the bolts, g; the main axle, O, rests on four bearers, P, which oscillate on four iron pillars, P, with gudgeons at each

end, of which the upper ones are connected with the bearers of the axle, while the lower ones rest on firm supports on the floor. In this way the axle is made to admit, to a certain extent, of alterations in the construction of the vessel. The two inside pillars are connected by the piece P'' , and the inside bearers of the axle by the braces, P''' , while between the ship's beams, adjacent to the engine, braces, p'' , are inserted with the disks, i' . The supply of steam in the cylinder, A , is effected by means of the regulating cylinder, B and B' , into which the steam passes through the pipe, a'' , with the valve, a . The connexion between the regulating cylinders and the cylinder, A , is shown in *pl. 18, fig. 2*, in the direction of the transverse line 1-2, in *fig. 3*; and in the direction of the transverse line 3-4, in *fig. 2*. The regulating cylinders have sliding valves, of which the details may be seen in *figs. 4, 5, and 6*, the valve-rod, c , being connected with the regulating apparatus of the whole engine. This apparatus is constructed as follows: On the axle, O , is placed the eccentric, Q' , from which the sliding-rod, Q'' , extends to the crank-bearing, i ; this bearing supports on its axis the lever, k , which is joined by the connecting-rod, l , to the angular lever, mn ; this turns on the gudgeon, n' , raising and lowering the valve-rod, c , at a calculated rate of velocity; the range of this movement is determined by the situation of the arrangement $i' i'' i'''$. An additional sliding lever, k' , is placed on the crank-axle, k , the different positions of which are shown in *fig. 7 a*, and *fig. 7 b*. This lever moves the sliding rod, l , and by means of this and the leverage, $o' l' l'' k'' j'' k'' l'' j''$, the steam is brought into the condenser, E , and its admission regulated; the cold water is injected by the pump, Z , the supply-pipe of which is U , and the piston-rod, V , connected with the working-beam, L ; the admission of the water is regulated by the apparatus, L' ; the pipe, D' , conducts the water into the condensing-trough, D ; the injection is regulated by a valve, which can be regulated on the disk, D''' ; the condensed water is raised to S by the hot-water pump, E , the piston-rod of which is moved by the lever, g' , of the working-beam, L , and returns through S' and S'' to the boiler. *Fig. 13* represents a self-acting exhausting apparatus in section, and *fig. 14* in outline; *figs. 11, 12, 15*, details of the stop-cocks. A is the chamber, with the two valves, a, b , which act on the pipes, C and B ; of these, a is a hand-valve and b the self-acting valve. Both valve-rods pass air-tight into stuffing-boxes on the upper part of the chest. D and B' are water-pipes, and E the stop-cock. On the valve-rod of b is a ring, connecting it with the two-armed lever, G , which turns on f ; g is a weight, which balances the ball, S' . As soon as the air is rarefied in H , the piston, h' , falls in the pipe; the weight, g , is raised at the same time with the valve, b , and the exhaustion is effected; jj is a pipe communicating with the supply-pipe, h , and the atmosphere.

Pl. 19, fig. 1, represents a longitudinal section, and *pl. 18, fig. 10*, a side view of the engine of 450 horse-power belonging to the steamship *Albatross*. In the following description the letters in brackets refer to *pl. 18, fig. 10*. A is the steam-cylinder, into which the steam is conducted by the regulating cylinder B , partly over and partly under the piston, and then into the condenser. C is the bed-plate of the engine, and D the condenser lying under-

neath. The cylinder A is surrounded by a jacket, A², in order to prevent the cooling of the steam. A constant body of steam circulates around the cylinder, passing off as it becomes condensed into water. The upper cap of the cylinder A¹ has a lubricator, s. In the steam cylinder is the piston, F, with the metallic casing, F', and at the piston head, G' [C], a connecting-rod [B] passes to the working-beam G [E'], and moves it up and down on its pivot, l [E]. The cross-piece I [D] is attached to the first connecting-rod, moving the lever Hh in the different positions I¹ and I², to which is hung the piston-rod, K, for the air-pump. At the other arm of G, in L [E''], is the connecting-rod, M [L], which, in the positions L¹ and L² of the working-beam G, turns the crank gudgeon N [L], and thus puts in motion the axis of the paddle-wheels O [M]. On the axis, O, is the eccentric, Q [M'], and also a second eccentric in the opposite direction. This eccentric, Q [M'], acts by a sliding rod, Q' [N], on the regulating lever, m [N'], with a movable counterpoise, and by the regulating lever [P] on the sliding rod, J [J], of the regulating valve, B, in the cylinder, B. *Pl. 19, figs. 19, 20, 21*, shows the position of the different regulating levers and valves for the admission of steam over the piston; and *figs. 25, 26, 27*, for the escape of the steam into the condenser. The letters are the same as on the parts represented in *fig. 1*. On the working-beam G [E], at [F], is hung the sliding-rod for the piston-rod [Q] of the piston, R, of the hot-water pump, E, which through the valve, R', raises the water from the condenser, D, through o' to S, whence it returns through S' to the boiler. The piston-rod with its head [G] passes through the stuffing-box, T. P is the frame of the engine.

The marine engine is fed from a boiler in the same manner as those used on land. Steamships are furnished with from four to six boilers. *Pl. 19, figs. 12-15*, represents a common boiler, one belonging to the French steamship *Tancred*. *Fig. 12* is a front view; *fig. 13*, a transverse section; *fig. 14*, a longitudinal section; and *fig. 15*, a horizontal section. The same letters in each of the figures refer to the same parts. A, A', A'', are portions of the boiler, which is heated by the grates, B. From these the flame passes through the chamber, C, and the flues, D, which run in different directions around the boiler, the smoke escaping by the chimney, F. The steam collects in the chamber, G, whence it raises the valve, *efgg'*, and passes through the pipe, J, as soon as it has sufficient force to raise the valve, I. The pipe H is the steam-pipe which conducts the steam to the engine. K is the man-hole for cleaning the boiler. The pipes, L, L', L'', which are shut by the cocks, M, communicate with the atmosphere by the pipe b. The apparatus OPR is connected on one side with the cold-water pump, and on the other side with the conducting pipes of the condenser, in order to supply the boiler with water. Of late the tubular boilers, which have heretofore been used only for locomotives, have been introduced successfully into steamships. *Figs. 16-18* represent a tubular boiler for an engine of 450 horse-power, belonging to the English frigate *Phoenix*. *Fig. 16* is the front view and transverse section; *fig. 17*, the longitudinal section; and *fig. 18*, the view of one half from above. A is the water chamber;

B, the steam chamber; D, the furnaces with the grates, G; and the ash-pans, which are shut by the doors, *e*. The flame passes through F, behind the tubes, then through them, when it heats the water, which also surrounds all the heated tubes, converting it into steam, and finally passes through the front flue, I, into the chimney, C. The valves, *a*, give access to the tubes, for the purpose of repairing them, and the state of the fire may be ascertained by the sliders, *b*, *b'*, *b''*; *c* and *d* are gauges showing the height of the water. It will be perceived that here are two boilers, adjacent to each other, with a common chimney.

The earliest method of propelling steamships, and the most usual to the present day, is by paddle-wheels. *Pl. 18, fig. 20*, shows a longitudinal section; *fig. 21*, the upper part of the deck and the lower half of the frame; and *fig. 22*, the vertical cross-section of such a steamship. In the middle of the ship, at F, is the engine, which, by its motion on the crank *a*, turns the axis A, as we have seen above in the description of the steam-engine. On each end of this axis, A, are two large paddle-wheels, C, which by their revolution act as oars and propel the ship. The boilers are at E, and D is the sheet iron chimney. O is the engineer's room, and GG are the wheel-houses. The paddle-wheels are from 11 to 35 feet in diameter, and from 3 to 12 feet in breadth. Their frames are of wrought iron; the floats are of wood, standing obliquely to the surface of the water, in order to avoid the tremendous noise when the wheel strikes, and to diminish the loss of power which always takes place at that time. The wheels sink about the breadth of their paddles into the water. In order to take advantage of a favorable wind, steamships are fitted out with masts and a pretty complete set of sails, consisting both of yard-sails and gaff-sails. The bowsprit carries a jib and stay-sail.

The first war-steamer was built in America in 1814. It was bomb-proof, five feet thick in the sides, in order the better to resist the shot of the enemy, and consisted of two vessels connected together, one of which had the furnace and boiler and the other the steam-engine. Between the two was the paddle-wheel. It also carried masts. The main-deck bore 32 18-pounder carronades, the balls for which were heated in the furnace. It had an apparatus by which sixty casks of hot water could be thrown upon an enemy who should attempt to board. *Pl. 17, fig. 6*, represents a French steam-frigate with three masts, and which in case of necessity can be propelled altogether by sails. *Pl. 16, fig. 6*, is the Bremen steamboat *Gutenberg*, plying between Bremen and Bremen-haven, and carrying no sails. *Fig. 7* is the American steamer *Washington*, built in New York in 1846-7. The deck of this ship measures 230 feet. Its tonnage is 2000 tons carpenters' measure. The keel is 16 inches square. The frame is of white oak. The main-mast is 80 feet high and 28 inches in diameter, the fore-mast 78 feet high and 25 inches in diameter, and the mizen-mast 76 feet high and 21 inches in diameter. The bowsprit is 45 feet long, and the jib-boom 24 feet. The ship has two engines with 72-inch cylinders and 10 feet stroke. The frame, the axis, and the working-beam are of wrought-iron. The wheels are 30 feet in diameter. Each of the boilers is 36 feet long

and 15 broad, and weighs 43 tons. They are tested at a pressure of thirty pounds to the square inch. The ship can make from 8 to 10 miles an hour without sails. The first cabin accommodates 142 passengers, and is fitted up with great elegance. The main saloon is 85 feet long and 22 feet broad. There are also a barber's shop and smoking-rooms. The galley contains 575 square feet of surface and cooks for 400 persons. There is a second cabin. In the lower hold there are large iron cisterns, from which water can be carried to any part of the vessel by force pumps. The hold has 375 tons of stowage-room for merchandise. A special room is appropriated to the mail. The *Washington*, although long since superseded both in swiftness and elegance by other ocean steamers, deserves to be recorded as the pioneer of American Trans-Atlantic steam navigation.

It may be desirable under certain circumstances for one of the paddle-wheels to work while the other stands still; but as the axis with its crank is of one piece, such an arrangement of the wheels would be impossible. A special apparatus has consequently been invented, and is shown in *pl. 18, figs. 16 to 19*. *Fig. 16* is a side view, *fig. 17* a cross-beam of the apparatus, *fig. 19* a front view; and *fig. 18* a view from above after the removal of the upper cap. The axis, *O*, the crank, *N*, and the cross-beam, *M'*, on each side are of one piece, and to the cross-piece is attached the connecting-rod, *M*, which, when moved by the engine, puts this part of the axis in motion. The place of the second crank is supplied by the apparatus. A cross-beam, *M*, is placed on a gudgeon resting on the screw-block, *F*, which is covered by the plate, *C*, through which the screw, *V*, passes, in order to secure the gudgeon, *M'*; *ff*, are two screws, which tighten or loosen the band, *B*; the block, *F*, has cogs underneath, so that when the band, *B*, is drawn tight it catches into the teeth of the disk, *N*, and makes it revolve with it. As the disk, *N*, and the axis, *O*, are concentric, this disk, as well as the axis, *O*, of the paddle-wheel, which is connected with it, must revolve at the same time with *O*. But if the band, *B*, is loosened by the screws, *ff*, the disk, *N*, slides and becomes out of gear with *F*, and consequently only the block, *F*, moves with the axis, *O*, while *O'* stands still, until the screws, *ff*, and hence the band, *B*, are tightened, and the disk, *N*, is again brought into gear with *F*.

We will now consider those steamships which have Archimedean screws, or simply the screw-propellers, which have recently come into frequent use, though it is not more than nine or ten years since the first experiments with them were made.

It was desired to simplify the propelling apparatus of a ship as far as it could be done without diminishing the velocity, to avoid the risk of breaking the paddle-wheels, and to protect the motor of the vessel in men-of-war from the enemy's fire, by which the wheel-houses were easily destroyed: the Archimedean screw fulfils all these conditions. As early as 1768 it was proposed by Paucton, a French mathematician, to propel a vessel by means of the Archimedean screw, but he was only laughed at. This did not prevent Delisle, an engineer in France, from entertaining the same plan in

1823. He suggested the application of the Archimedean screw to the marine steam-engines, but obtained no success; until at last the idea was carried into effect in England by Ericson and Smith. The earliest screws were constructed on the plan shown in *pl. 19, fig. 28*. They were simple Archimedean screws, only one thread winding around the axis; afterwards two threads were made use of (*fig. 29*), forming a double screw. The steam propeller *Archimedes*, in England, had a screw of the first kind. At a later period the plan was adopted of removing the inner parts of the screw which greatly increased the lee-way, and employing only segments of the screw. Meantime Ericson had applied three strong arms to the axis of the screw, in the direction of the threads; six curved segments were then bolted on the outer edge of the screw, which taken together formed nearly a whole circumference of the axis. The mean angle of inclination is 45° . The method adopted in the galliot *Napoleon* (which is shown as seen from above in *fig. 2; fig. 3*, in longitudinal section; whilst *fig. 4* represents the stern parts, with the screw) is a combination of Ericson's system and of the screw (*fig. 28*), the segments, of which there are three, contracting to a considerable degree on the inside, and joining the axis by a wave line, which is well adapted to cut the water to advantage, without causing too much lee-way. *Fig. 5* shows the construction of the wooden model for the four-bladed screw, first employed in the galliot *Napoleon*. Two double-armed fans, C, of wood were attached to the axle, A, and spreading out from $b^1 b^2$, and $a^1 a^2$. The segments or blades of the screw are thus formed, and are afterwards completed by the addition of the surfaces B, B^1 , B^2 , B^3 , curved from the side; these segments are seen at $a^1 b^1 c^1 d^1$, $abcd$, $a^2 b^2 c^2 d^2$, and $a^3 b^3 c^3 d^3$. The three-bladed screw (*fig. 6*) was subsequently adopted, of which a front view is shown in *fig. 7*. Here the blades B, B^1 , B^2 , are placed on the axis, A, with the surrounding lines, $abcd$, $a^1 b^1 c^1 d^1$, and $a^2 b^2 c^2 d^2$. The form which nature gives to aquatic animals was closely studied by George Rennie, who noticed that it expands towards the hinder end, like the tail of a fish for instance, while the other parts almost all run together in a point. Following this law, he gave his screw a conical form, making the surface an inclined plane which winds around a cone, so that the threads should be tangents to its surface. *Pl. 19, fig. 8*, is a side view of a conical screw, with the continuous blades, *ee*; *fig. 9* is a front view; *fig. 10* is a side view of such a conical screw, with separate blades, *ee*; and *fig. 11* a front view of the same. *Fig. 30* is a view from above of Smith's propeller, which is intended as a substitute for the Archimedean screw, and *fig. 31* is a side view of the same. Around the axis, *n*, is a disk, to which the bearers, *mm*, are attached, each couple of which supports a platform, like the steps in a treadmill.

In the section of the galliot *Napoleon* (*fig. 2*), A is the bowsprit, B the head, C the cabin for the crew, D the boatswain's cabin, E the foremast, F the stairs to the cabin for the forward deck passengers, G the cabin, H the prison, I the steam chimney, J the boiler, K the main-mast, L the steam engine, M stairs to the engine, N fly-wheel and pinions for the axis of the screw, O engineer's cabin, P officers' and passengers' cabin, R cabin

stairs, Q mizen-mast, S the captain's cabin, T luggage room and coal room, ¹ catheads, ² forge, ³ port-holes, S (on the stern) boat-davits, ⁴ rudder, ⁵ the screw, ⁶ the axis. In *fig. 3*, the view from above, A is the bowsprit, B the head, C the capstan, D covering of the cabin stairs for the crew, E forge, F the fore-mast, G stairs for the forward-deck passengers, H sky-light to the forward-cabin, I prison, J galley, K funnel, L the main-mast, M roof of the engine-room, N stairs to the same, O covering over the fly-wheel, P sky-light for the engineers' cabin, Q sky-light for the officers' cabin, R the mizen-mast, S stairs to the officers' cabin, T sky-light to the captain's cabin, U poop, ¹ catheads, ² port-holes, ³ chain pump, ⁴ coal-room, ⁵ feeding pump, ⁶ rudder, ⁷ boat-davits.

The dimensions of this galliot are as follows : Length of deck, 155½ feet ; breadth of beam, 28 feet ; depth of draught, 11 feet 10 inches. The engine is of 120 horse-power ; diameter of the screw, 7 feet 6¾ inches, length, 3 feet 6½ inches. The masts carry gaff-sails for the most part. *Pl. 17, fig. 2*, is a French iron steam battery, with an Archimedean screw ; it carries thirty-two eighteen-pounders, and is of a round build at stem and stern ; it has two masts, the forward one with a main-sail, top-sail, top-gallant-sail, and also a stay-sail, while the after-mast has only a half mizen-sail and a try-sail.

MANNING OF SHIPS.

We include in the *manning* of a ship all persons who take any part in its management. A degree of subordination is carried into effect in a fleet which is not known in the land service ; but this subordination is necessary, inasmuch as not only the safety of the ship, but the lives of the whole crew and passengers often depend on the act of a single sailor, or on his negligence or disobedience of orders.

A. *The War Marine.*

The manning of ships of war is usually arranged according to a fixed system. We will first consider this, referring chiefly to the organization of the French and English navies.

In France, the sailors are taken from among the conscripts, and are obliged to pass through a certain course. They first become sailors of the third class, and in six or eight months can be promoted to the higher classes on the nomination of an officer. A sailor of the first class (*pl. 20, fig. 17*, a sailor in parade-dress ; *fig. 18*, one in working-dress) can become a *quatre-maitre*, with the rank of a corporal, or *second maitre* (*fig. 16*), with the rank of a sergeant, or finally *premier maitre*, or boatswain (*fig. 15*). The mechanics, caulkers, smiths, carpenters, &c., can only obtain the rank of sergeant-major. Every one who is not accustomed to the naval service is struck with the difference which prevails between the two ends of the upper-deck. Forward of the fore-mast, on the fore-castle, is the general rendezvous of the sailors ; while abaft the same, especially near

the poop, access is permitted only to the officers (*pl. 21, fig. 3*), except on duty.

The career of a naval officer is open to every one. Pupils are received into the service, when those who distinguish themselves are sent to a naval school, which in France is on board a ship appropriated to that purpose, in the harbor of Brest. Upon entering on actual service, after passing an examination, the pupil becomes a cadet of the second class and receives a uniform. Once on board, the service commences. Ten or twelve cadets have a state room (*pl. 21, fig. 6*) assigned to them, which becomes the scene of their studies, their recreations, and their rest. The cadets on board are divided among the officers of the different watches. The officer of the watch is distinguished by his complete uniform and arms (*pl. 21, fig. 1*), which he must wear during his watch. His position is on the quarter-deck of a frigate and on the poop of a ship of the line. He has an eye upon everything which is to be done in the ship, during his time on deck. If a boat is to be got out, he gives the order by calling its name, "Long boat!" "First cutter!" &c. The boatswain's mate, who is constantly stationed at the foot of the main-mast, gives a shrill whistle, the sailors spring to, and in less than five minutes the orders are executed (*pl. 23, fig. 5*). The boatswain's mate reports to the officer of the watch, who calls the cadet on duty, gives him the necessary instructions, receives his report on his return, and issues further orders.

After a cadet has served two years in every branch of practical seamanship, he becomes a cadet of the first class (*pl. 20, fig. 14*), with the rank of a second lieutenant in the land service. The promotion of the cadet to the next rank is a more important one, as it classes him among the officers of the ship, with the rank of a first lieutenant in the army, and a separate room (*pl. 20, fig. 5*). The officers, second lieutenants, and first lieutenants (*fig. 4*, a French lieutenant; *fig. 13*, an English lieutenant), the last with the rank of a captain in the army, have a separate table. A lieutenant can command a transport ship and a steamboat. Corvettes and brigs are under the command of a corvette captain, and frigates and ships of the line under the command of a captain (*fig. 3*, a French captain; *fig. 12*, an English captain), with the rank of a colonel in the army. A division of several sail is commanded by a rear-admiral, ranking as a brigadier-general, while the vice-admiral (*fig. 2*, a French vice-admiral; *fig. 11*, an English commodore), ranking as a lieutenant-general, commands a squadron or a small fleet, which may run up even to the number of fifteen ships of the line. The highest advancement in the navy is the rank of admiral (*fig. 1*), who in France has the rank of a field-marshal.

In England, below the admiral is the vice-admiral, who commands the second division of the fleet, and the rear-admiral, commanding the third division. The vice-admiral carries his flag on the fore-mast, and the admiral at the main-mast. In England, moreover, the admirals are distinguished by their red, blue, or white flags, according to their station in the English navy. *Pl. 20, fig. 6*, is a Russian vice-admiral of the regular navy, *figs. 7, 8*, Russian officers of the Finnish navy, and *figs. 9 and 10*, Russian officers of the marine guards.

The sailors are organized into *watches*, something resembling the companies of the army, consisting of a lieutenant, answering to a captain of the land service; several naval ensigns as first lieutenants and cadets of the first class as second lieutenants; two mates for the sails, one for the guns and one for the ship's course; eight quarter-masters, four of them for the sails, two for the guns, one for the carpentry, and one for the caulking; and finally, of one hundred men. Any naval officer may, in cases of necessity, be required to take the command, and incredible achievements have sometimes been performed by young men whom the casualties of the service have placed in situations of responsibility. In illustration we have represented an engagement of a weak brig of 16 18-pounder carronades, compelling another brig of superior force, having 22 32-pounders, to strike her flag (*pl. 25, fig. 4*).

As soon as the men are on board, the officers must assign to them their respective stations for every emergency. The order of battle comes first. This is the basis of the whole organization, and it is no easy thing to find just the right men for every post. This order is constantly practised. At any time of the day or night, the drum may beat to quarters, and every man be summoned to his station. The most active and skilful sailors are selected for duty on the tops (*topmen, pl. 25, fig. 6*); they are intrusted with the most difficult part of the management of the sails and ropes; they often swing on the mast-head or yard-arms, in order to arrange a rope or block, or sit during an engagement on a yard, to watch the motions of the enemy (*pl. 23, fig. 2*), while the ship is so tossed about by the storm that the green hand at sea has to cling to everything which he can grasp in order to keep on his legs.

The boatswain of a ship of the line or a frigate must be a perfect seaman, presenting a model to the whole crew. He has in his charge the whole rigging of the ship, the anchors, cables, and buoys, and all damage which they receive must be repaired under his direction. The sailing-master's mate and his men are stationed near the poop on the quarter-deck. The sailing-master, under the superintendence of his superior officer, issues orders to his mate, who transmits them through the boatswain, boatswain's mates, and quarter-masters, to the sailors and boys. The wheel stands under the poop (*pl. 21, fig. 2*). As soon as the squadrons have come together, the signal flags are got in readiness, and the national flag is hoisted with all the honors at the mast-head (*pl. 24, fig. 3*). The hour-glass is in charge of the sailing-master, who has the command of the wheel. His mate stands at his side, to assist in case of need. Certain sailors at the wheel, under the command of a cadet or quarter-master, have the care of the flag, seeing that it constantly waves and is not struck except by orders from the commander.

The rest of the crew, who are not fit for more important services, keep the deck clean, under the direction of the boatswain's mate (*pl. 23, fig. 7*), or they indulge in amusements, among which is card-playing, which is followed up without restraint in every place that can be found. This is also a favorite recreation during the watch, the deck at the foot of the long boat furnishing a card table (*pl. 25, fig. 7*).

There are not wanting on board ship greater or less offences, insubordination, mutinies, and the like. The laws of discipline in the fleet are accordingly very severe, corporal punishment being almost the only resource of the officers in most navies. The commander of the ship has the power of life and death, and whenever a crime or a serious violation of orders takes place, a court-martial is convened (*pl. 24, fig. 1*). The session of officers for this purpose is held on the quarter-deck. The accused is brought forward without fetters, and the charge is presented, while the crew crowd around the spot. After the fact is established, the court enters into secret session, and each of the judges, beginning with the youngest, gives his opinion. In most cases the punishment is flogging with a rope's end; the English use the cat-o'-nine-tails, a rope whip with nine lashes, the ends of which are interwoven with musket balls. Keel-hauling (*fig. 2*), which has now been discontinued in nearly every navy, is purely a seaman's punishment. When it is to be inflicted, a special flag is hoisted, and a gun is fired as a signal to the other ships of the fleet, which thereupon get out their boats and surround the ship in a semicircle. The delinquent is then taken under the main-yard, and his feet are loaded with a 30-pound cannon ball. The master-at-arms then reads the sentence, and the criminal is suddenly drawn up by a side tackle attached to the main yard. The rope is then slacked, and he is plunged with frightful velocity into the sea and then drawn under the keel. This operation is repeated two or three times, according to the strength of the prisoner. In the Dutch navy this punishment is equivalent to death. Smaller offences are punished by stopping the rations, especially spirits, for three or four days, or by confinement in irons (*pl. 25, fig. 8*). In the last punishment, the sailors are taken from arrest to their watch, and then brought back. Extra watches are also inflicted as punishments.

While a man-of-war is in port, a regular and often an unexpected visit is made by the port-guard, in order to examine whether everything is right on board the ship (*pl. 22, fig. 5*). The boat, in such cases, is commanded by a port-officer, and as soon as it approaches the ship it must be hailed by the guard, to whom the reply "Watch-boat" is given.

The artillery is so far subject to the direction of the commander of the ship that he has a speaking tube, the mouth-piece of which is under his control, the tube leading below the deck, through which he issues his orders. One man for every gun, during action, carries shot and cartridges from the hold (*fig. 4*). Non-combatants are generally selected for this duty. A very important point, which must be attended to at the commencement of a battle, is the condition of the pumps. It must be seen that they are in order and properly manned to pump out the water which enters through the shot holes. The fire-engine must also be looked after. The head caulker attends to all these points, and on the first summons to quarters takes his place at the pumps. He takes care that twisted plugs of hemp, ropes, sheet lead, nails, and plugs wound round with tow and dipped in tallow, are ready to stop up the shot-holes which are made at the water line. For this purpose slings are provided (*pl. 23, fig. 1*), by which men

are let down to close up any such holes, and to put in a fresh caulking. If the ship draws so much water that it cannot be controlled by the pumps, it is the duty of the chief caulker to give private notice of the fact to the commander.

B. Manning of Merchant Vessels.

In merchant vessels the discipline is by no means as strict as in men-of-war, as there is no military organization to be preserved, nor is there such a large number of men to be kept in order. The captain has the chief authority. Everything is governed by his orders, and he possesses the full power of punishment. The first mate takes his place in all cases when the captain is prevented from being at his post. It is his duty to communicate the orders of the captain and see that they are obeyed. There is also a second mate and a third mate, who strictly oversee the men, take charge of the boats on landing, superintend weighing and casting the anchor, and, in short, provide for the exact performance of all the duties of the vessel. The sailors, owing to their limited number, which in merchant vessels is always reduced to the lowest figure, perform in common the various duties which are required at sea, since they would be too weak were they divided into separate classes with special duties.

MANAGEMENT OF SHIPS.

A. Management of Separate Ships.

1. NAVIGATION IN GENERAL. The ocean is not everywhere the same, nor is it the wind alone which changes its aspect. The different portions of the sea, the sky which is reflected in it, its natural qualities and phenomena, have their peculiar characteristics, which are not without influence on the navigation in different seas. The icebergs which float in the polar latitudes prevent us from reaching the poles. In those regions, calms and storms, fine weather and tempests, alternate with each other in a single day. During the summer, as it appears in these ungenial climates, the atmosphere is warm and pleasant in a calm; but the north wind rises, and an icy coldness takes the place of the mild air. The moving ice stretches its long furrows through the waves, and stares in strange and grotesque forms towards the sky. When these mountains of ice approach each other, they form a circle, within which the sea is quiet as in a harbor, while on the outside the waves are raging with increased violence. A ship inclosed in such a basin of ice (*pl. 26, fig. 3*) lies as securely as in the best harbor, but woe to it when the circle suddenly breaks up!

In the temperate climates the sea is kept in constant motion by the changing winds. The waves from the north-west in the Atlantic Ocean exercise their uniform rocking influence on ships sailing towards the Azores until they come into the latitude of the trade winds between the tropics. These are disturbed only by the equatorial currents, which separate the north-east trade winds of our hemisphere from the south-east trade winds of the southern hemisphere. Long days pass by without the surface of the

ocean being ruffled by the slightest wind; the ship, with all its sails unfurled, seems to rest upon the waves (*pl.* 26, *fig.* 4); when often, as if by a freak of Neptune, a stormy wind springs up from the black clouds which rise from the sea, and the masts are broken, the sails are shivered, and the rigging is torn in pieces.

The mariner who wishes to navigate the ocean must be acquainted with all its peculiar features. For this purpose he makes use of charts, which point out the reefs which he must avoid and the course which he is to follow. When he is once at sea, the compass is his only guide. This alone can tell him the direction which he is to keep, when nothing but sky and water are before him. It is well known that the point of the magnetic needle always turns to the north, whatever be the direction of the ship, and consequently enables the mariner to ascertain its true position on the ocean. For this purpose, a thin plate of isinglass is cemented under the needle, turning with it about its centre. This circular plate, like all circles, is divided into 360 degrees. If, then, the deviation of the line of direction necessary for the voyage from the meridian line is measured by means of a circle divided in the same manner on the chart, the ship can easily be so turned, that its line of direction shall deviate the same number of degrees from the meridian, and it will thus reach its object without any other guide. In order to facilitate the observation of the compass, the circle is again divided into thirty-two parts, called points of the compass. These thirty-two points are named as follows. The four cardinal points are called north, east, south, and west. Between these are four others, north-east, south-east, &c. Between these eight points are eight others, north-north-east, east-north-east, &c., and between these sixteen are sixteen more, north by west, east by south, &c., completing the full number thirty-two. These last are again subdivided into fourths, for greater precision of steering, and designated thus: North $\frac{1}{4}$ east, north-west by north $\frac{1}{2}$ north, and so on. The mariner has also his hour-book, giving the true position of the stars for every hour, the artificial horizon, and the sextant, which enable him, according to the angle which the vessel makes with the stars and the horizon, to ascertain her place when he can get a good observation of the sun or of a star, as he can thus ascertain the true time of the spot where he is and calculate his position by the difference of time from his home or from Greenwich. For this purpose he has the most accurate watches and chronometers, some of the latter keeping time with so much precision that they do not lose a minute in a voyage round the world. When he can get no astronomical observation on account of cloudy weather, he calculates his position by the speed of his ship, measured hourly by the log, and by the mean direction in which he has steered. This is called *dead reckoning*, and is necessarily less accurate, as the influence of currents and of leeway can only be conjectured.

2. PRACTICAL NAVIGATION. Practical Navigation, which we are now to consider, teaches the use of the sails and rudder, on every occasion, so as to produce the suitable motion, speed, and direction of the ship, in order to reach the end of her voyage. For this purpose we first have recourse to the rudder.

Whenever the tiller, and consequently the rudder, is placed in the same direction as the keel, no effect is produced ; but if, while the ship is moving forward, the tiller is turned to starboard, the rudder moves to larboard, and the water striking on the ship acts on the rudder, and brings the stern to starboard, while the bow is carried to larboard, and conversely ; if, on the other hand, the ship is moving backwards, and the tiller is turned to starboard, the water strikes the ship from behind, driving the rudder which stands to larboard before it, and hence sends the stern to larboard and the bow to starboard, and conversely.

In order to explain the action of the sails, we premise the following : Suppose a weather-cock standing on its spindle during a calm, in any direction you please ; for instance, the broad end to the west. Let a south wind now blow gently ; it will turn the broad end before it, until it comes into the same direction with the wind. But if the rod had passed through the middle of the vane, making the parts on each side equal, the wind could produce no effect, its pressure being equal on both ends, and the vane would remain at rest. Let a ship be imagined to be such a vane, and the rod supposed to pass perpendicularly through the centre of gravity, D (*pl.* 7, *fig.* 18). Now let a three-masted ship be turned with its bow towards the west, and the wind blowing from the south, or on the larboard, we call this the windward or *weather side*, and the other the *leeward side*. If a square sail is now hoisted at the fore-mast, the lower weather clew stretched with the tack, the lee clew with the sheet, the starboard (lee) braces holding the yard in the direction of the sheet, the vessel is said to be on the *larboard tack*, and the sail has the double effect of turning the ship to leeward on the supposed axis, D, and at the same time of driving it forward in the direction of the keel. Let a jib now be raised on the jib-boom, with its tack fastened to the end of the boom, and the sheet drawn aft, a great power is applied to turn the ship to the leeward, as the jib is further from the line D, and consequently forms a longer arm of the lever. All the sails which are placed forward of the centre of gravity, or of the line D, will exercise this power to a greater or less degree according to their position ; that is to say, all the forward sails have a tendency to make the ship fall off, or turn before the wind to the leeward. If we now suppose a square mizen-sail stretched forward with the larboard tacks and aft with the starboard sheets, this sail will turn the ship to the starboard, and of course to the leeward, and at the same time drive her forward ; but the bow is thus made to stand to windward, and the ship is said to *huff*, or go to windward. All the aft sails, therefore, drive the vessel towards the wind. If both mizen-mast and fore-mast sails are set, each acting with the same power, they each drive the vessel forwards ; for, since the force on both sides of the axis, D, is equal, no turning either of stem or stern can take place. If the mainsail alone is raised, the tack being forward of the axis, D, and the sheet abaft of the same line, the ship is likewise driven forward without turning. If the fore-sail is braced aback with the larboard or weather braces, while the leeward tack is stretched forward, and the weather sheet aft, the action of the sail is to make the bow rapidly fall off to the leeward, while at the same time it drives

the ship backwards in the direction of the keel. As the sail lies against the mast, with its forward surface exposed to the wind, it must have a contrary effect to that which takes place when it is filled, and as the wind now comes from forward, while the sail is braced aback, the sail has a greater power to drive the ship to leeward. If the mizen-sail is braced aback it drives the ship backwards, but turns the stern to leeward, so that the ship luffs. *Pl. 26, fig. 10*, shows vessels which luff, or bear to windward.

So much for the first principles of navigating a vessel; we will now present some cases of their practical application. Let us suppose a ship with all the sails furled (*fig. 5*). The object is to loosen the sails; the sailors are on deck; the commander gives his directions to the second officer, who gives the order (if, for instance, the topsail is to be unfurled), "*Set top-sails!*" The top-men then run up the shrouds, stretch out on the footropes, leaning the body against the yard, cast off the gaskets, and sing out, "*All clear!*" when the order, "*Loose!*" is given, and in a moment the ship is covered with a cloud of canvas, behind which the sailors disappear, running down the shrouds. On deck the ends of the sail are stretched to the main or fore-yard by the topsail sheets; then the topsail-yard is hoisted to the topmast-head by the halliards; and finally, its arms set in the required direction by the topsail braces. This manœuvre is performed when the sails are to be set, or merely stretched in order to be dried. *Fig. 2* shows a ship of war with a part of its sails loosened for drying.

Tripping the anchor and bringing the sails to the wind is called getting under weigh. When the anchor is to be weighed a boat is sent out to the buoy, and with a small windlass raises the anchor from the ground; it is then hove up under the davits by the capstan and secured to the bow. Meantime the sails are set on the general order, "*Stand by to make sail!*" (*pl. 26, fig. 6*). The orders now follow "*Loose the top-sail!*" and "*Loose the top-gallant-sail!*" &c., on which the clew-lines are overhauled, the tacks and sheets made fast to the clews, the yards drawn up by their lifts, and the sails stretched as much as possible. At the same time the yards are braced at right angles with the ship's axis, and so directed that the ship, as soon as it is free from the anchor, may turn round and take the wind in its sails. *Fig. 7* represents a ship which has turned, with its larboard braces forward and its starboard braces aft. On the order, "*Haul taut starboard fore-braces,*" the yards of the foremast are made parallel with the main yards, and the ship now takes the wind in her sails. *Pl. 27, fig. 1*, shows two ships which have got free from the anchor and have just set sail, the one to the left not having yet braced up.

It is surprising to many persons when they see two ships on the same river, or the same sea, and making use of the same wind, yet sailing in opposite directions, one to the right and the other to the left. We will here explain this operation, which is called sailing on a half wind. We will assume that a ship, with a north wind, is to sail towards the east, and in that case the wind stands precisely at right angles, or eight points, with the direction of the keel. Let the ship fall off these eight points, and head with the bow to the east, the yards being braced in the diagonal between the

direction of the wind and the direction of the keel, or making an angle of four points with the keel. Under these circumstances the sails take the wind, and drive the ship forward in an oblique direction, making great lee-way; but the great length of the ship, and the water which presses against its immersed portion, offer a continued resistance, while the curvature and the slender shape of the bow permit the ship to cut the water with more ease in the direction of the keel, and thus the lee-way is diminished and the headway increased. It is now evident that with the same wind, the yards being braced four points in the opposite direction, the ship can also sail towards the west. *Pl. 26, figs. 8a, 8b*, represent two ships which move in opposite directions. If the direction of the wind is not at right angles with the direction of the ship, but at some angle either greater or less, the yards in that case are not braced in the diagonal, but at an angle corresponding with the direction of the wind, and the ship sails more or less close to the wind. If the wind blows from the left hand, or the larboard side, the ship is said to sail on the larboard tack; that is, the larboard tacks draw down the clews of the sails so that they may catch the wind: the contrary is called sailing on the starboard tack. In order to change from one tack to another, or to take the wind from one to another side, the ship must be turned (*pl. 26, figs. 9a, 9b*). For example, if you are sailing with a north wind towards the east-north-east on the larboard tack, or west-north-west on the starboard tack, the ship can be turned either before the wind or up into the wind. The former manner of turning is less desirable, because it occasions great leeway, as the ship before the wind makes considerable headway before it can be luffed up on the other tack. The method usually adopted of *going about* is, therefore, that of running the ship through the wind. The helm is put hard a-lee, and consequently the ship is brought up to the wind and gradually into it, so that the sails catch it forward, when instantly all the braces and the lower sheets and tacks are loosened, and the yards swing round, taking the wind from ahead. Before the progress of the vessel, however, can be fairly checked they are braced round on the other tack, whilst the helm is brought amidships and gradually sharp down the other side of the ship, to prevent the vessel from going further through the wind than just to fill the sails on the new tack. Good sailors in this manœuvre hardly lose two ship's lengths in leeway.

If a storm arises by which the sails are exposed to danger, it is necessary to reef them, slacking the tacks and sheets, and hauling in the clew-lines and leech-lines (*fig. 11*). At the same time the sailors man the yards, standing on the foot ropes (*pl. 23, fig. 3*), take in the sails, and fasten the reef-lines, thus diminishing the area of the sail. *Pl. 27, fig. 4*, represents a ship in heavy weather under close reefed topsails.

Ships sailing with a side wind have to take great care, especially when they are struck in squalls by the wind. If a ship in that case goes under full sail, the moment may come in which all the sails hang loose and flap in the wind, while the next moment the sudden force of the wind either lays the ship on her side, so that the yards and spars dip into the water, or the sails are split, and the braces, tacks, and sheets are snapped asunder.

In such cases it is prudent to reef the larger sails by degrees, and to furl the smaller ones altogether. *Pl. 26, fig. 12*, is a ship of war under such circumstances, with only the main topsail, the mizen sail, and the jib unfurled, while all the rest have been secured. A storm, moreover, arising from these side winds combines with the violence of the waves (*pl. 27, fig. 5*), and often lays the ship on one side, so that it seems impossible for it to be righted. But a storm on the open sea is less dangerous than in the vicinity of the shore, when only too often cliffs and breakers, which the most practised seaman cannot avoid in a storm, make a total wreck of the vessel. Still more terrible than a storm is a fire on board ship, as it is only in rare cases and when it is early discovered that it can be extinguished, and everything is irretrievably lost unless the boats can be got out in season. A ship on fire usually burns down to the water-line (*pl. 24, fig. 4*, shows the burning of the ship of the line *Trocadero*), when the keel falls off, or the ship bursts open with the heat and sinks, or finally the powder magazine takes fire and blows everything to pieces.

B. Manœuvres of Fleets.

The purpose of naval tactics, or the manœuvres of fleets, is to keep the fleet always in the position in which it can first secure its own safety, and then, under all circumstances, to annoy and, if possible, to conquer the enemy. The best sailing order is represented in *pl. 28, fig. 1*. The fleet is divided into three columns, sailing parallel with the line which it is to take in battle. The windward column, under the command of the vice-admiral, usually forms the van-guard; the leeward column, under the command of the rear-admiral, forms the rear-guard; although circumstances often render a change in this order necessary. If the fleet is very large (*fig. 2*), each column is broken into two, making six in the whole. The admiral's ship then moves before the centre of the two columns belonging to each. The determination of the distance between the columns is always a matter of importance. The length of the column being known, if (*fig. 3*) the perpendicular CH , equal to CF , is raised on the column CF , the points F and G connected, and FH taken equal to FC , then GH will be the right distance of the columns. (By mistake of the engraver the letter H is omitted in the figure; it belongs at the intersection of FG and AE .) This is evident when we look at the first ship, C , and the last ship, E , standing equally close to the wind, to which the line CE is perpendicular. An approximate proportion for the distance is five twelfths of the length of the column.

The distance between two ships varies from forty to one hundred fathoms. In *pl. 28, fig. 4*, AB and $A'B'$ are two rows of hostile ships of the line drawn up in order of battle; CD and $C'D'$ are frigates and fire-ships, the last stationed on the wings or centre and protected by frigates on the bow and stern. The last lines are so arranged that they lie to the windward if the enemy is to leeward, and conversely. In the rear of these are two more lines, EF and $E'F'$, formed by the hospital ships, transport ships, &c. *Pl. 29, fig. 3*, shows a division of a fleet in the line of battle. *Fig. 2* is a steamship, employed to carry messages from one line to another.

Frigates were formerly used for this purpose. Steamships, however, on account of their swiftness and ability to move in any direction, are far more convenient. *Fig. 4* represents the moment of battle. At *a* are seen the two battle lines, and at *b* the grappling between two hostile frigates.

The order of retreat is shown in *pl. 28, fig. 5*, although in fact this is usually governed by circumstances. The fleet is here formed in two lines, AB and BC, forming an obtuse angle, the vertex of which is made by the admiral's ship in the centre of the fleet. The frigates, fireships, &c., form two other lines, EF and FG, to the leeward of the former.

It is important to know the different methods by which manœuvres can be performed in one and the same sailing order, without breaking it. We cannot here consider the subject at length, but must be content with representing the movements by figures, with a few words in explanation. *Figs. 6 and 7* show two methods, by which columns can sail both by day and night without disturbing their ranks. *Fig. 8*, the columns turn before the wind. *Fig. 9*, the columns sail in two different directions close to the wind. *Fig. 10*, manœuvre by which the centre column is changed into the windward column. *Fig. 11*, change of the windward column into the leeward column. *Fig. 12*, change of the centre column into the leeward column. *Fig. 13*, manœuvre of the windward column in order to sail to the leeward. *Fig. 14*, manœuvre of the leeward column in order to advance to the leeward.

When the admiral has ordered a ship to a certain position, it is the duty of the commander of the ship to obey the orders promptly, and to make good the position required, cost what it may. For this purpose, the so called ship's square has been invented (*fig. 15*). Let the figure be the ground-plan of a ship, EF a portion of the longitudinal axis lying over the keel, and ABCD a square in which the line EF passes through the intersection of the two diagonals, then will the angles DGE and CGE be each equal to 135° , and these will be the two courses in which the ship sails close to the wind. If now these angles are bisected by the lines GH and GI, these lines will indicate the direction of the wind on the tacks. Hence, if a ship in the direction EF sails on the starboard tack, its course by the wind will be on the semi-diagonal GD, and if it sails on the larboard tack in the direction EF, its course will be on the semi-diagonal CG. Applying this result to a fleet, which sails in three columns, the front coinciding with the direction of the wind (*fig. 16*), it follows that all the ships must sail parallel with each other and the line drawn through the main-masts of three ships (one of each column) will, in like manner, be parallel with the front line. If we now place the ship's square around the centre ship, the coinciding ships in the columns, as respects the tacks and the winds, will lie in the direction GH and GI, while the ships of each column with their longitudinal axes lie in FE or parallel with it.

The ships sometimes by accident fall out of the line, and it is important to restore the line of battle immediately. The chief rule in this case is for the ship which was at the head of the line to pass to leeward behind the front,

and taking the wind in the proper sails, to return into the line. The other ships following this, set their sails, according to the distance, in order to come into the direction of the first ship. *Fig. 17* shows the position, when it is desired to change the line of battle without forming the ships into columns. This is effected by turning all the ships at the same time, while the last takes the wind on the other tack, and remains in its place, the other ships falling off two points, and sailing on until they come into the direction of the stationary ship. The last ship by this evolution takes the place of the first, and the left wing of the right. But if the first order is to be preserved, the first ship veers round in its place and strikes out the course of the new line, on which it sails forward, while the other ships, one after another, veer round in the same place and follow the direction of the first.

A very beautiful manœuvre is the change from one order of sailing to another. We will here illustrate two cases. Suppose that it is required to change the sailing order into the line of battle in the same direction, while the lee column remains as it was (*pl. 28, fig. 18*). In this case the lee column keeps as close as possible to the wind, the centre column falls off two points, and passes to the head of the new centre column, while the windward column veers at once in its position, and with seven points of wind sails to its new station on the wing. A second case, when the line is formed from the sailing order in another direction, is represented in *fig. 19*. Here the windward column commences the manœuvre, turning about in column into the new line, while the centre and lee columns remain stationary, until they also sail into the new line, and then tacking, complete the new line of battle.

The manœuvre of forming columns from the order of battle is shown in *fig. 20*. The right wing here forms the lee column, and the first ship tacks, the others of the same column following. The first ship of the centre which is now to form the windward column, proceeds with its column in the line of battle until it arrives at the point where it can tack into the new direction; it then leads its column into the right line, and at the proper distance, while the left wing, which is to form the centre column, follows the windward column to the point where the first ship tacks and leads its column into the open space. *Fig. 21* shows the same manœuvre, where the columns are to be formed on another point.

In our examples hitherto, we have supposed that during the manœuvres the wind remains unchanged. If the wind shifts ahead, it is difficult to restore the order of battle, especially if the enemy's fleet is in sight. If the wind comes from one up to six points ahead, and it is desired to restore the order on the same point, each ship, after it has fallen off, adds a few points, with the exception of the foremost, which diminishes the same number. The number of these points is ascertained by deducting from eight points half the points by which the wind has shifted; for example, if the wind shifts 5 points forward, $5\frac{1}{2}$ points must be added to the course. As soon as the first ship falls off and begins to sail in the new line, the second and the rest follow, until the whole lie close to the wind in the new line.

Fig. 22 shows this manœuvre. The last example which we will here give is that of changing a battle line into a retreat line with the wind ahead (*pl. 28, fig. 23*). After the fleet has fallen off, the first ship goes four points free, while the others keep close to the wind, each following exactly in the wake of its leader. When the first ship of the centre column arrives at its turning point, that is, in the wake of the second ship before it, it tacks and the ships of its column follow. The lee column is formed in the same manner.

As an example of the manœuvres of a naval battle, we will describe in *figs. 24–33* the principal points of the engagement between the English and French near the islands of Martinique and Guadaloupe, which was fought April 8–12, 1782.

On the 8th of April, the cruisers before Port-Royal Bay at Martinique brought intelligence that the French fleet with several transport ships was under weigh. The British fleet, which lay to the northward of Cross-Islet-Bay, near the west point of Martinique, instantly set sail and pursued the enemy with an east-north-east wind, guided by his night signals through the whole night, until morning, when the *Valiant* discovered the enemy. *Fig. 24* shows the English fleet at 2 o'clock in the morning of April 9th, when it fell in with the French fleet, F, at Martinique. At half-past 5 the signal for battle was given, and the line of battle formed. G shows the position of the French fleet at 5 o'clock, on the starboard tack, in order to go with the wind into the channel between Martinique and Guadaloupe. A single ship, H, stands so far to leeward that it must have been taken, if the wind had not been unfavorable to the English. *Fig. 25* shows the van-guard, A, of the British fleet, which was engaged in close action with the centre of the French fleet from 9 to 10 o'clock. The centre and the rear-guard of the English fleet lay at B, under Dominica. F is the position of the French, some of whose ships did not come into the line, because they did not catch the wind. It may be seen from *fig. 26* how A, the centre of the British fleet, gained the wind and joined the van-guard, B, about noon. The rear-guard, which lay under the wind at C, formed in the line, D, and a second cannonade ensued of about one and three-quarter hours. F is the position of the French, who kept at a great distance, thinking that the shot of the English would not reach them. Afterwards they put the head of the fleet in the position HH. G is the fleet of transport ships. *Fig. 27* shows at A the British fleet on the morning of April 11, with two ships, G, of the French, which had been chased into Bas-Terre in Guadaloupe and destroyed. Two others were soon found at H, near Dominica. A general chase was then ordered, as four French vessels, at I, were still seen from the mast-head of the *Formidable*, Lord Rodney's ship. The French admiral, Count de Grasse, gave chase to the *Agamemnon* and some other ships at B, in order to secure his ships at H, but without success. We come now to the events of April 12. At 6 o'clock in the morning, the English fleet (*pl. 28, fig. 28*) had changed its position from B to A, taking advantage of the wind which blew from W. The French fleet was discovered in some confusion at F. One of the ships lay quite to leeward at G. It had lost its bowsprit, the fore-mast was lying

across the deck, and the ship was in tow by a frigate. The wind had veered round to Z. The *Monarch* and the *Valiant* made an attack on these ships, while Count de Grasse hastened to their aid at H. At 4 or 5 o'clock the van-guard of the English was at D, and as it was supposed that Count de Grasse had come too far to leeward to avoid an engagement, the *Monarch* and the *Valiant* were recalled into the line. The French, who perceived their position, took the larboard tack, hoping that as the wind had veered to Y, they might regain their former point beyond the reach of the English guns, especially as the rest of the fleet were gathering round them. The lines A and F (*fig. 29*) show the position of both fleets at half-past seven in the morning, when the *Marlborough*, the first ship of the English, had reached the fifth ship of the French fleet. The signal for closing the line and joining battle was now given. The effect of this manœuvre was to throw the ships on both sides in the position represented in *fig. 30*, where each French ship stood opposite to an English one, with a vigorous interchange of shots. The French fleet at F had gained the weather-gage of the enemy; the British admiral's ship, the *Formidable*, was within half musket-shot of the fourth French ship; a hot fire was kept up along the whole line, until a space appeared in the French line making a breach possible, separating the van-guard from the rear, and compelling the first ship of the French rear to go to leeward towards G. *Fig. 31*: A is the *Formidable*, the British admiral's ship; F, the *Ville de Paris*, which bore the flag of Count de Grasse; B, the English van-guard, lying opposite the cut-off part of the French line; H, the last ship of the French van. In *fig. 32*, we see the *Formidable*, the *Namur*, and the *Drake* making a hot fire at A, B, and C, on the first three ships of the French rear-guard, which effected a retreat to G. F is the French van-guard, which in two divisions attacked the English line, while the centre column sailed to the westward towards H. As soon as the French van had passed the English line, it separated into two divisions, one of which, the centre division, consisting of six ships, sailed westward towards H (*pl. 28, fig. 33*), while the other, with twelve or thirteen ships, sailed to the south-south-west, towards F, with Count de Grasse. A is Lord Rodney's ship with a part of the centre in pursuit of the enemy's van-guard, and B is the British rear-guard performing the same manœuvre. Count de Grasse now attempted to unite with his southern division, F (*fig. 34*), and form a new line of battle. This, of course, modified the plan of the English fleet, which pressed down towards AB, upon which the French tacked away in the direction of I. The centre division of the French, H, now attempted to follow the division G. *Fig. 35* finally shows the south division about 6 o'clock. The English had overtaken it; and it turned to the northwards, when it was inclosed by the British fleet, A. Count de Grasse then struck his flag, and five French ships, F, were taken. The ships H reached those lying at G, and with them effected their retreat.

C. Signals.

For communication between ships at sea from a distance beyond the range of the speaking trumpet, or for private interchange of notices, advice, questions, or orders even within that range, a system of signals has been devised which is equally simple and perfect. It consists of ten different small flags of easily distinguishable colors and designs. Each of these flags has the value of a figure, the ten representing 1-9 and 0. With these flags any number can be expressed, they being drawn up at the mast head one above the other, the lowest representing units, the next tens, the third hundreds, and the uppermost thousands. The necessity of quickly changing signals prevents the use at the mast head of more than four number-flags at a time, as a greater number would easily get entangled in the rigging, and would also occupy so much room as to hide the lower flag behind the upper sails. The number of signals is therefore limited to 9999. In order to do away with the restraint of this limit, however, the system has been enlarged by introducing small pennants of various descriptions above the number-flags, giving to the numbers shown under each of the pennants a different signification. As an example we will suppose a white pennant over the number-flags to have been adopted for general orders and a red one for inquiries of all kinds. The number 1357 under a white pennant would then perhaps convey the order "Prepare for action," whilst the same number under a red pennant is perhaps the question, "Is there any ice in these parts?" It is evident that this method admits of an unlimited number of communications. The value of the numbers is preconcerted and recorded in signal-books which are kept on board of every ship belonging to the same fleet or nation. Besides those signal-books that are published and therefore accessible to everybody there are also private signals given under special pennants, or in a special place of the rigging, the import of which is only known to the first and second in command, and which are recorded in the private signal-books, of which there are two kinds; the one adopted for all cases of secret communication between the higher officers of a fleet; the other prepared for a specific occasion and only referring to the emergencies of that one expedition. In time of action all orders of moment emanate from the admiral's vessel, which mostly occupies the centre of the line of battle. In order that the signals given by the admiral may be at once known to the whole fleet, repeating frigates are stationed in the rear of the line, whose duty it is to repeat the signals of the admiral as fast as they appear, the positions of these frigates being so taken that all the vessels of the line can see one or the other.

In the merchant service the same system is adopted for the exchange of names, destination, position, &c., and a very extensive series of questions and answers relating to marine affairs has been prepared and published in a signal-book by Captain Marryat, which is now found on board of nearly every merchant vessel.

For communications at night a similar system of signals has been adopted consisting of lanterns of various colors and displayed in various combinations

and positions in the ship, either on deck, in the shrouds, in the tops, or at the peak. The signal of a wish to communicate at night is given by rockets or Bengal lights. A ship signaling with flags is represented in *pl. 26, fig. 1*; night signals in *pl. 25, fig. 5, a, b, c*

HARBORS, NAVAL ARSENALS, AND LIGHT-HOUSES.

A. Harbors.

In order to furnish a safe berth for vessels when they are not at sea, for the purpose of taking in or discharging their freight, a place is necessary where they can find a good anchorage and a secure protection from storms. Such places on the sea-coast are called harbors. A good harbor must have a situation suitable for its objects, whether intended for men-of-war or for merchant vessels. This is the first requisite. It must, in the next place, be entirely protected from storms by the adjacent coast. Lastly, it must possess a sound, tenacious bottom of clay or mud. A sand bottom also may be used, but a rocky one is wholly impracticable. If a harbor gets stopped up with sand, it must be dredged, for which purpose two different kinds of machines are used. One is the common dredging machine (*pl. 31, fig. 6*) which is most serviceable on flat and gravelly bottoms. It consists of a flat-bottomed boat, which is towed by a vessel to the place where it is to be used. The tow-ropes run on a windlass, so that the position of the boat can be changed without tacking the ship. The main part of the machine is a large wheel, with a rope winding on its axis, by which the dredging-box is raised. This is fastened to a long handle, which also rests on the axis of the wheel. As the rope unwinds, the dredging-box sinks to the ground, taking a part of the bottom as it is drawn away. It is then brought to the surface of the water by the further revolution of the wheel, its contents are discharged into a boat, and the same process is repeated. A far more effective machine is the steam-dredger, of which *pl. 30, fig. 8*, exhibits a view seen from above, and *fig. 9* a longitudinal section. The foundation of this also is a flat-bottomed boat, in which is the steam-boiler *A*, with the safety-valve *C*, and the chimney *D*. The steam passes from the boiler to the engine *B*, which by means of a fly-wheel *b*, and different cog-wheels, turns the axis *m*. At the end of the axis, a mitre-wheel moves the wheel *F*, on the pentagonal axis of which the bucket-chain *FF* revolves, bringing the sand to the surface, where it is discharged into the mud-scow *G*. By means of the chain *t*, which passes over the beam *o*, of the windlass *g*, the bucket-chain can be raised or lowered by the pulley *p*. Artificial harbors like those of Dunkirk and Toulon (*pl. 32, fig. 2*) require extensive and costly works, as the whole system of dams which inclose the harbor must be erected from the bottom of the sea. As scarcely any use can be made of sails in harbor, vessels are towed to the spot where they are to cast anchor (*pl. 30, fig. 2*). In the vicinity of a harbor is usually found.

B. The Roadstead.

This is a place of anchorage where vessels may lie at anchor more or less protected from storms, for the purpose of discharging or of taking in a portion of their freight. A roadstead is either inclosed or open (*pl. 31, fig. 1*, where a division of a fleet is lying at anchor); in the latter case it is only a good landing, but affords no protection to ships, except a convenient anchorage. An inclosed roadstead (*fig. 2*) is so surrounded by the land and the adjacent heights, that it protects vessels from the ocean winds.

C. Docks.

A deep basin is usually made on one side of a harbor, or in large rivers, which is filled with water by means of sluice gates, and is then again laid dry by means of special sluices on the sides. Ships are sometimes taken into these docks, for loading and unloading; but they are most generally brought in to be repaired. The docks are so arranged, that they are of equal height with the low-water mark, so that the ship can be taken in and out at flood-tide. This kind of docks is called wet docks. Dry-docks are those mentioned above, which can be laid dry by means of special sluice gates. *Pl. 32, fig. 9*, shows a section of the Dundee Dry-dock. *Fig. 10* is a view of one half seen from above. *Fig. 11* is one half the transverse section at the end, and *fig. 12* one half of the transverse section near the sluice gate, *a* is the dock, *b* the stairs leading to the bottom, *c* the sluice-chocks, *d* the gate, *e* the floor, the forward floor, *g* and *h* locks for letting the water off and on, *i* and *k* openings to the sluice gates.

Fig. 11 shows the blocks on which the staging for the ships is placed. *Pl. 30, fig. 1*, shows the dry dock in Toulon harbor. In it are two ships building. Another construction is shown in the Prince's Docks at Liverpool, of which *pl. 32, fig. 3*, shows a transverse section of the chamber, *fig. 4* a transverse section near the mouth of the sluice, *fig. 5*, the profile of the western wall, and *fig. 6* the profile of the same wall near the sluice-mouth. *Fig. 7* is the profile of the wall of the London dock. It is lined with iron. *Fig. 1* is the ground plan of the West-India docks in London. They are wet docks, intended only for loading and unloading vessels. On their account store-rooms are built in their vicinity. The South docks and Timber docks are used for repairs. Harbors and docks, where they adjoin the water, are provided with quays, up to which the ships can be brought. These quays are of considerable height, with deep sides, and are usually built of stone. *Fig. 8* shows the profile of the Mersey quay in Liverpool.

D. Ship Yards and Machines.

A good harbor is usually provided with ship yards, places where new ships can be built on the stocks, and old ones brought in for repairs. In a ship yard, there are *ways*, which are dry at ebb-tide (*pl. 30, fig. 3*), on which the ship is placed by the tide or by machines, when it can be laid on its side, and new coppered or caulked and graved (*fig. 4*). There are

also *stocks* (*pl. 31, fig. 5*), on which new ships are built. These are afterwards covered over with an arched roof, which protects them from the weather. *Fig. 3* shows a crane for setting masts. This machine is sometimes movable, and in that case placed on a scow. *Fig. 4* shows a pile-driving machine, for the purpose of driving posts and pile-bottoms into different places in the harbor.

E. Arsenals.

Navy yards, or harbors for men of war, always have an arsenal, where the equipments of ships are kept and also manufactured. Here are found cannons, balls, bombs, anchors, and so forth. There are also a forge for anchors, a cannon foundry, an iron foundry, a rope walk, a sail-maker's loft, and in short, all the mechanics' shops in which the utensils of a ship are made.

F. Diving Bells.

A very useful apparatus, the diving bell, is also kept in harbors and roadsteads. It is well known that when a bell is immersed in the water, the presence of the air inside counteracts the power of the water, so that if the bell is of sufficient size, one or more men can descend in it to the bottom of the sea, and there pursue their labors (*pl. 30, fig. 6*). For this purpose, a frame with a strong tackle is fitted on a boat, by which the bell is suspended. This is then let down with men in it, who remain at the bottom until they give a signal to be drawn up. They take ropes and chains with them, which are attached to any object which they wish to save and this is drawn up together with the bell (*fig. 7*). In order to supply the men with fresh air, leather hose pass to the surface of the water, provided with valves. By means of them the bad air is discharged, and fresh air supplied.

G. Observatories.

Observatories, with signal-lights for night use, are erected for the purpose of seeing ships as they come into the harbor, and of noticing everything which may occur on the water and of reporting arrivals by signals (*pl. 4, fig. 8*). *Pl. 31, fig. 2*, and *pl. 30*, in the lower corner at the right, show several of these observatories.

H. Light-Houses.

Many dangerous points are found on coasts, where sailors who are not acquainted with the locality, or who have no pilot on board to take them over the dangerous places, are very liable to suffer shipwreck. These points are designated by signals. High towers are erected, in which lights are kept burning all night. Light-houses are also built at the entrance of harbors (*pl. 4, fig. 6*). In the earlier ages, fires were made use of as signals; but at the present day, lamps, provided with reflecting apparatus on a large scale, are employed. As this light might be easily mistaken for a star, they are so arranged that the light is shown only at intervals, or periodically.

changes its color. There are: 1. *Light-houses with stationary, intermitting lights.* The Trieste light-house is one of these. *Pl. 32, fig. 13*, is a front view of this light-house; *fig. 14*, a vertical section. The lower part of the tower is a casemated fortification, for the protection of the harbor. *Fig. 15* shows the ground plan of the basement, in the direction of the line AB; *fig. 16*, that of the casemates in the direction of the line AB in *fig. 14*. The lighting apparatus is represented in *fig. 17*: p, p^1, p^2 are frames for the stationary lamps, in a lantern provided with glass windows. On the stationary post k is a frame, $lmno$, resembling an umbrella, to which is attached a perpendicular screen q , covering one half of the inside of the tower. This frame is made to revolve by the wheels $abcd$ and $fghi$, which are moved by clock-work, so that the screen, q , at one time leaves the lamps free and then again conceals them. 2. *Light-houses with revolving, intermitting lights.* The Bell Rock light-house, which was erected in 1811 on one of the most dangerous rocks near Dundee, is of this kind. *Fig. 18* is a vertical section. The tower is washed by the waves, and the entrance, consequently, is above the range of the breakers at B; A, C, D, and E are the different stories of the light-house, in which the keepers live. At H is the watch-room; G is the lantern; K is a flag-staff, on which a signal flag is raised in the day-time. The lighting apparatus consists of an upright axle, which is turned by means of the clock-work F, and turns with it a frame, of which one half is a semi-cylindrical screen, plated on the inside, and highly polished, while the other half bears seven large and brilliant Argand lamps. As the axis revolves, the dark side of the screen and the burning lamps are presented alternately. 3. *Light-houses with revolving, intermitting, colored lights.* Of this kind is the Cordouan light-house at the mouth of the Garonne (*fig. 23*). The polyzonal lenses, I, invented by Fresnel are here used, by which nearly all the rays of light are thrown in parallel lines, while those which fall above and below are also thrown into parallel lines by the parabolic reflectors H and K. The apparatus consists of eight lenses, in the focus of which is a large Argand lamp, four inches in diameter, with its chimney, L. Four of these lenses are shaded green. The whole apparatus, with its foot, D, stands on the plate of the column, B, supported by the wheels, g . Above g is the cog-wheel f , in which plays the pinion, e , of the clock-work, E, which is moved by the axis d ; bc is a regulator with arms and conical pendulum.

The necessity of erecting light-houses in distant places, where skilful workmen and the requisite building materials are not to be had, has suggested to the English the idea of iron light-houses, which can be taken in separate pieces to their places of destination and there put together. *Pl. 32, fig. 19*, represents a section of an iron light-house constructed in London a few years since for the Bermuda Islands. The foundation up to the first story is built of stone, although the iron work commences in this portion of the building. In the second story the wall is much lighter, and is plated with iron plates on both sides. From the third story upwards iron plates only are used, which are shown in their upright joints (*fig. 21*) and in their horizontal ones (*fig. 20*). They are fastened with cast-iron flanges on the inside by strong iron screws. The stairs, floors, window frames, and

lanterns are all of cast-iron. C is the clock-work ; D, the lighting apparatus ; and E, a lightning-rod. The tower was erected without any scaffolding. On the floor of each story (*fig. 22*) a projecting derrick, *d*, was arranged, with a windlass at its foot, *a*. The rope of this, *b*, passed around a pulley, *c*, and raised the plate *e*, which was steadied below by a guy, *f*. A considerable number of these light-houses have been erected with success.

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